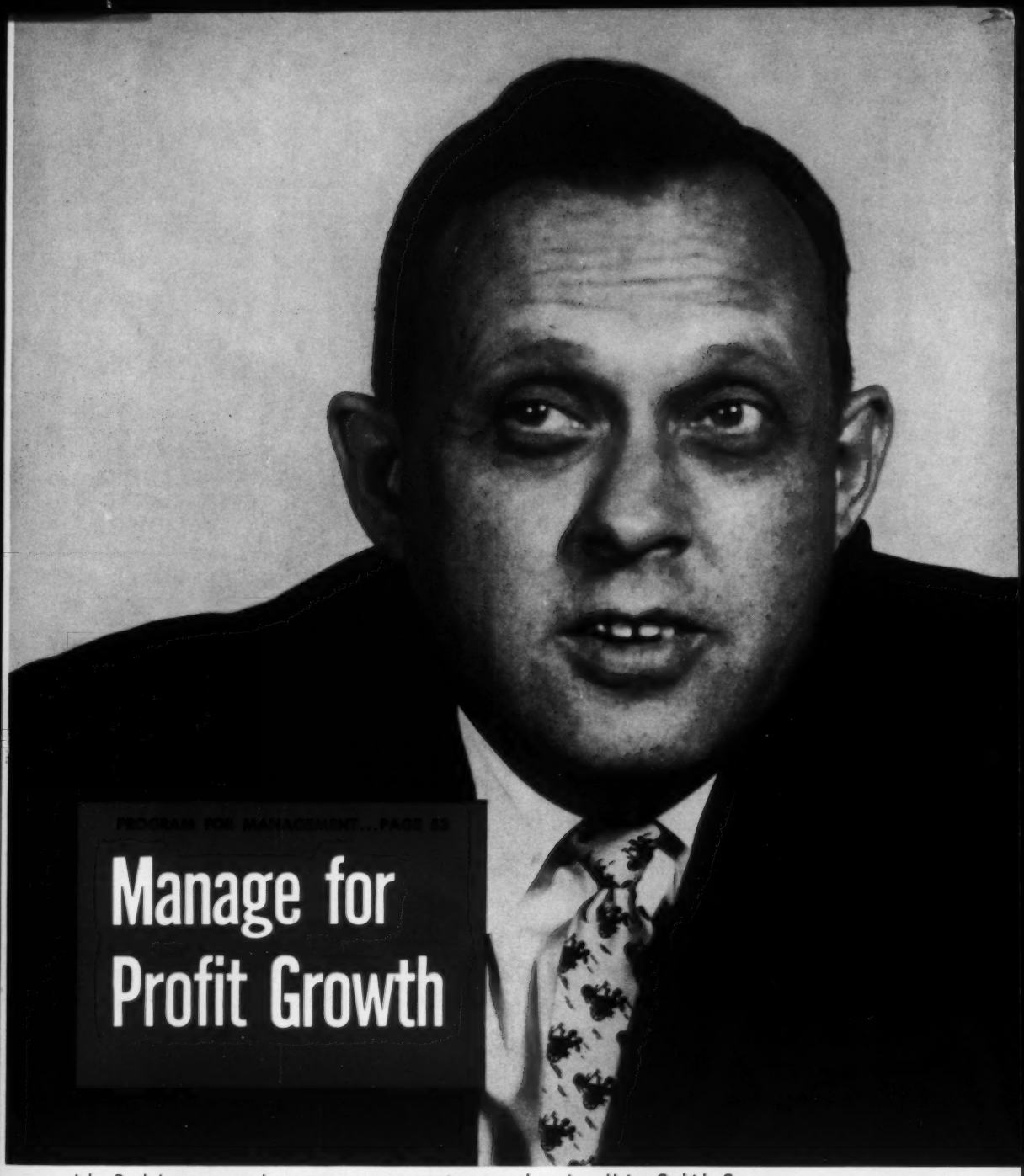
STEEL The Metalworking Weekly

JUNE 19, 1961



PROGRAM FOR MANAGEMENT...PAGE 53

Manage for Profit Growth

John Paul Jones, general manager, management personnel services, Union Carbide Corp.

Metals Vie for Construction Dollar 43

Composite Stainless Wire Adds Flex . . 88

Mold Trick Speeds a Casting Process 106

Where Stainless Will Go in 1967 125

METALWORKING WEEK—PAGE 17
COMPLETE CONTENTS—PAGE 19

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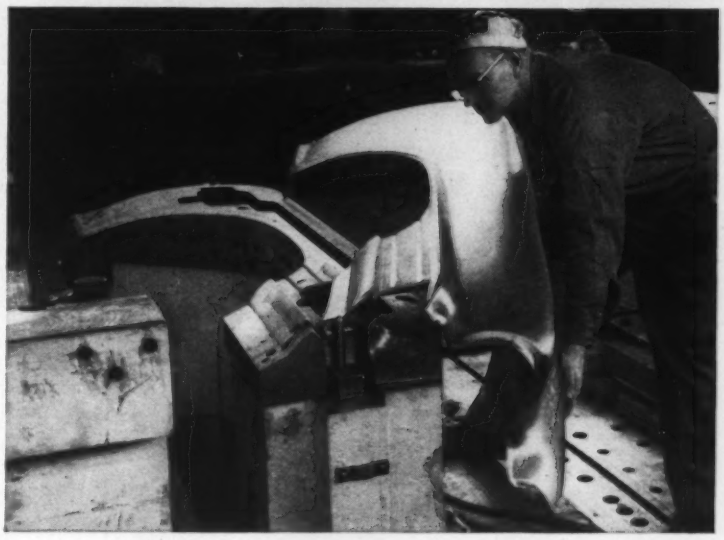
Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

Auto fenders trimmed with dies made from water-hardening tool steel



These photographs, taken at Mardigian Corporation, Warren, Mich., show the use of Bethlehem carbon water-hardening tool steel in trim dies for automobile front fenders. The dies, hardened to Rockwell C 62-64, trim 20-gage cold-rolled sheet steel. In the picture above, 15 sections of the tool steel, bolted into the casting, are ready for "Kellering." The companion picture was taken after the tool steel sections were machined to contour and heat-treated, making a completed form-and-trim die.

Engineers at the Mardigian plant reported fine results with Bethlehem carbon water-hardening tool steel. They especially liked its excellent machinability and uniform response to heat-treatment, plus the fact that modification could be easily accomplished by welding.

Due to their carefully controlled hardenability, Bethlehem carbon water-hardening grades deliver long service in applications calling for high shock-resistance. They have good resistance to wear, and plenty of toughness to resist the effects of cold battering.

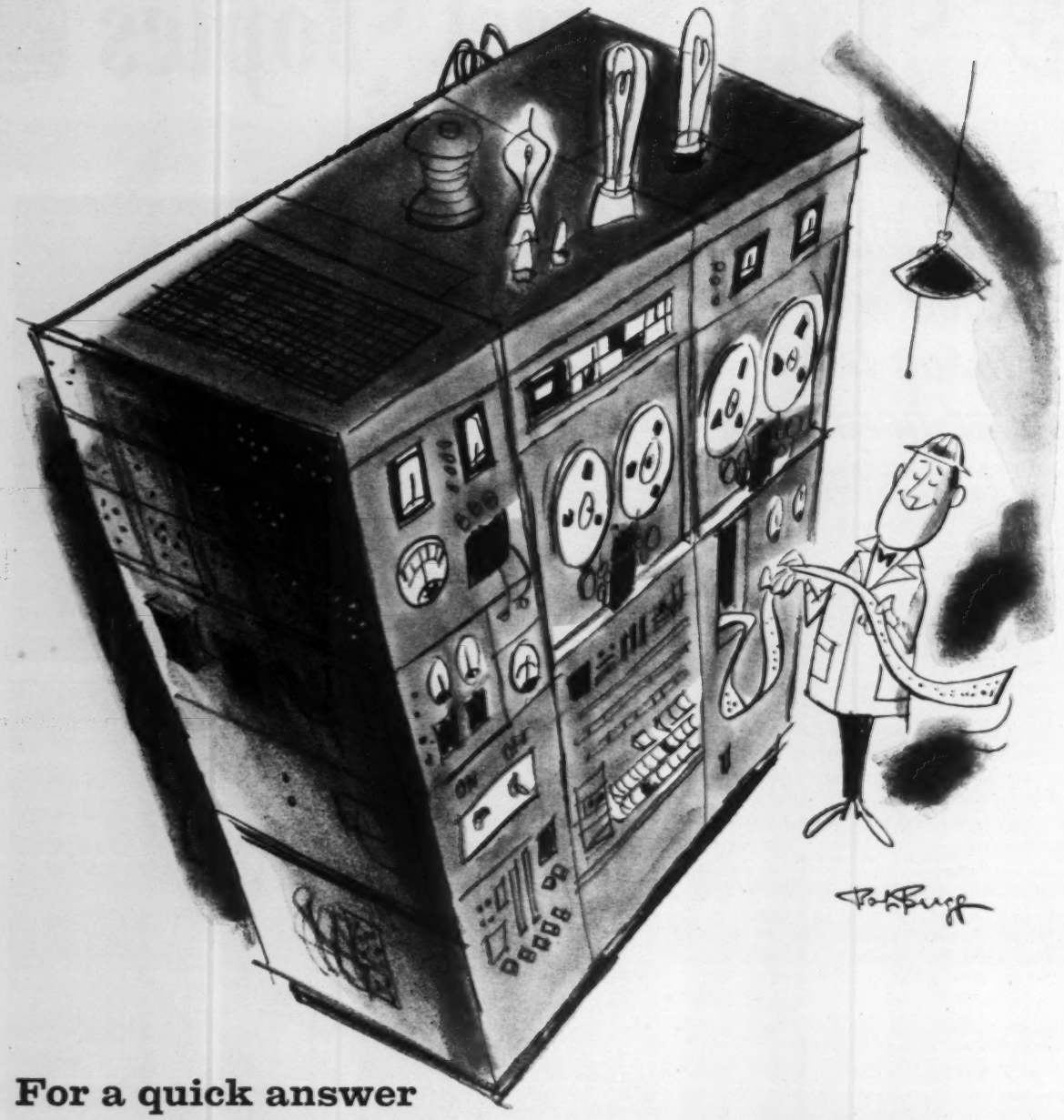
Your Bethlehem tool steel distributor has a wide range of carbon water-hardening steels in stock. He will be pleased to meet your needs. Get in touch with him today.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Avoid Early Failure of Cutting Tools by Removing the "Feather" Edges

When a grinding wheel crosses a tool edge, a small burr or "feather" remains on the edge, no matter how carefully or properly the grinding operation may have been carried out. If the tool is used with the feather-edge, it is equivalent to using a tool having a dulled cutting edge. Obviously, production from such a tool will not be as high as from a similar tool with sharp edges. Many machinists, recognizing this, carry a hand stone which they use in removing the feather from the cutting edges. However, the most practical and positive method of removing the feather from the edges of ground tools is by fiber brushing on a rotary wheel.

By removing the feather-edge before a tool is placed in service, the user is assured of increased production because the edges of the tool do not dull as rapidly.



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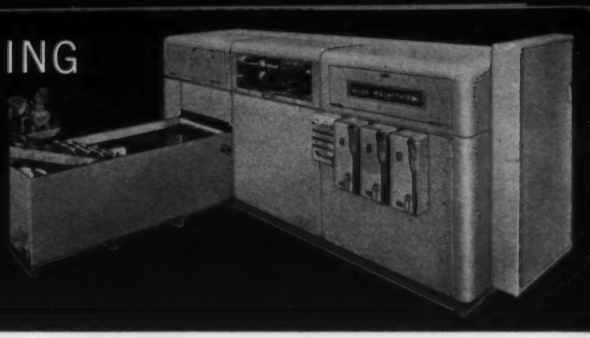

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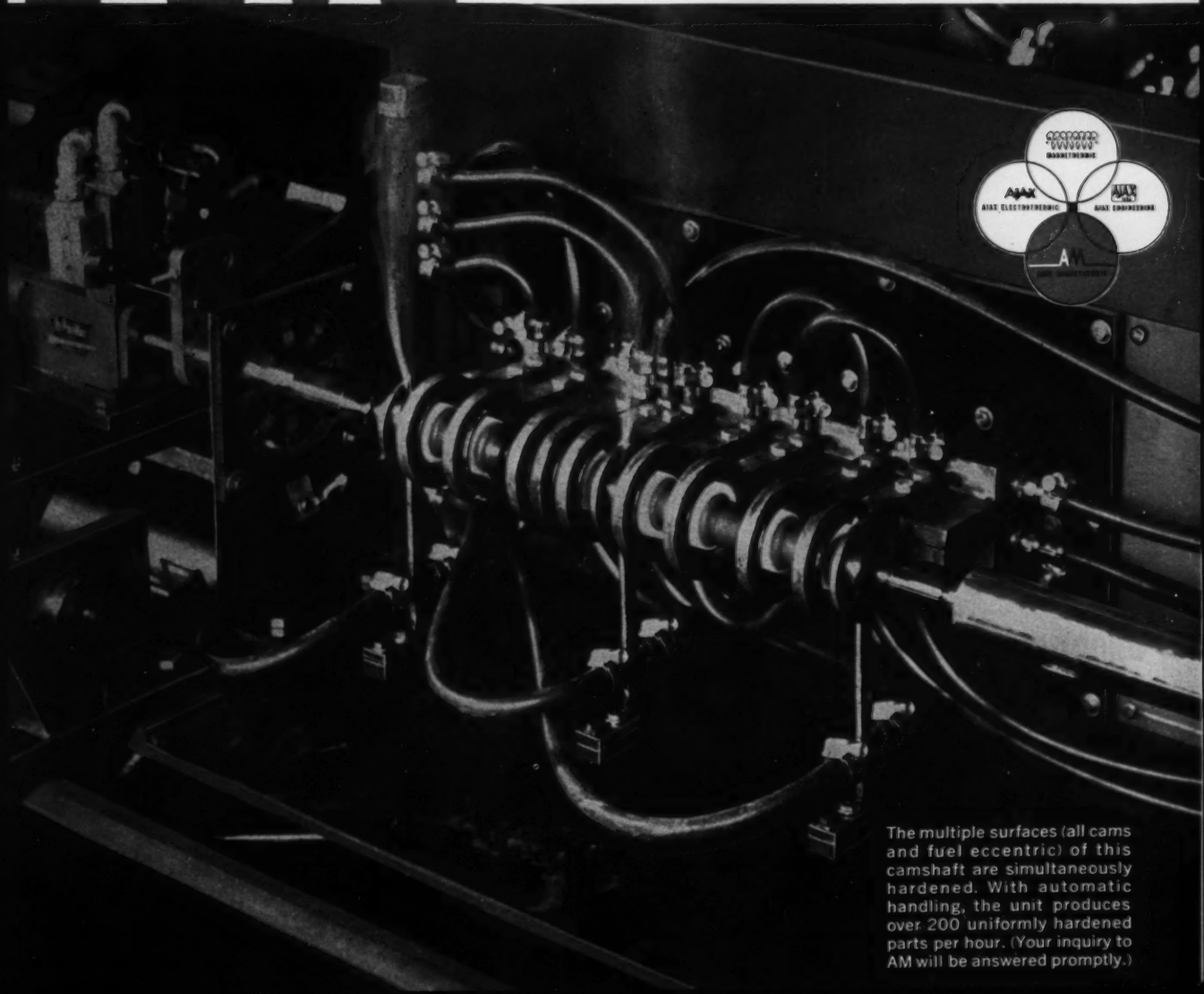

The multiple surfaces (all cams and fuel eccentric) of this camshaft are simultaneously hardened. With automatic handling, the unit produces over 200 uniformly hardened parts per hour. (Your inquiry to AM will be answered promptly.)

Shopworn. That's how technical data gets when it speaks with authority. By providing our customers with material that's sure to get shopworn, we help them get the most out of their machine tool investment. Ask the Field Engineer for a list of our publications. The **Warner & Swasey** Company, Cleveland.

'A Man's Judgment Is as Good as His Information'

We have finally stumped that estimable institution, the Cleveland Public Library. The above quotation appears at its front door. We were curious about the author. We asked Cleveland Public, which has speedily found the answers to equally esoteric questions for us hundreds of times.

After an unusually long delay, the library people bravely admitted they didn't know.

Well, no matter. The statement is true, whoever said it first. In fact, STEEL's basic reason for being can be summed up in the statement. The editors are constantly searching for facts to help you make decisions in your work.

Sophistication

The writers of new product announcements are getting cleverer all the time. In introducing a panel fluorescent lamp, General Electric Co. sent out a plastic model to give Assistant Editor John Teresko, proprietor of that column, an idea of what the item looks like.

Hot Fight over a Big Market

One of the hottest competitive battles is shaping up in one of the biggest markets—construction. Major opponents: Steel vs. aluminum and both vs. nonmetals. The prize: $600 billion worth of construction in the next ten years. Assistant Editor Perry Pascarella describes how the battle's brewing on Page 43.

Incidental Intelligence

Item: The clever Danes have developed an "iron cow" which can produce milk and cream. The machine consists of a 10 gallon, cylindrical mixing vat and a high speed centrifugal pump which mixes the ingredients—butter, nonfat skim milk powder, and water. The product: Full cream milk at what is claimed to be half the price of real cow milk. We don't understand it, but then the wonders of technology have always struck us as miraculous.

Item: Matt Dwork of Airborne Instruments Laboratory, a division of Cutler-Hammer Inc., has written an article in a company periodical explaining what a yo yo despin mechanism is. We gather that it's a legitimate term in the expanding vernacular of space technology, but that's as far as we got.

Item: Ever hear of Castro, Tex.? Neither had we until Market Editor Bill Rooney received a communique from there. It was from Louie Mathis, our Texas correspondent. As a reporter for the Houston *Post*, he was covering the campaign of Republican John G. Tower for the Senate seat vacated by Vice President Lyndon B. Johnson. The tour passed in or near Castro, so Louie's weekly steel market reports were posted to us from there.

A First for STEEL

In addition to being our first President and first in our hearts, George Washington has scored again. His picture appears in STEEL for the first time.

To learn how George figures in the current metalworking news, check Page 53.

The Hippo Caption

Captions for the picture of the Space Age hippopotamus are still coming in. The one we like from this week's crop: "Nyet!" It was submitted by William R. Ross of Nilsen Mfg. Co., Addison, Ill.

Collectors' Items

We collect sardonic motto cards put out by such companies as American Cyanamid Co. and Wolverine Tube Div. of Calumet & Hecla Inc. Here are some we especially like:

Be reasonable . . . do it *my* way

My mind is made up . . . don't confuse me with facts

Haste makes waste . . . but it LOOKS better

Come on in . . . everything else has gone wrong today

Please don't talk while I'm interrupting

I may have lots of faults . . . but being wrong isn't one of them

Please listen distinctly

On what do you bias your opinions?

Think or thwim

Don't look back . . . something might be gaining

How about your favorites? We'd like to hear from you.

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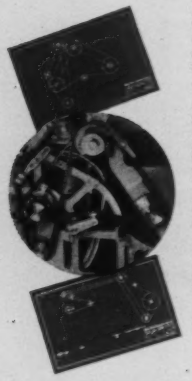

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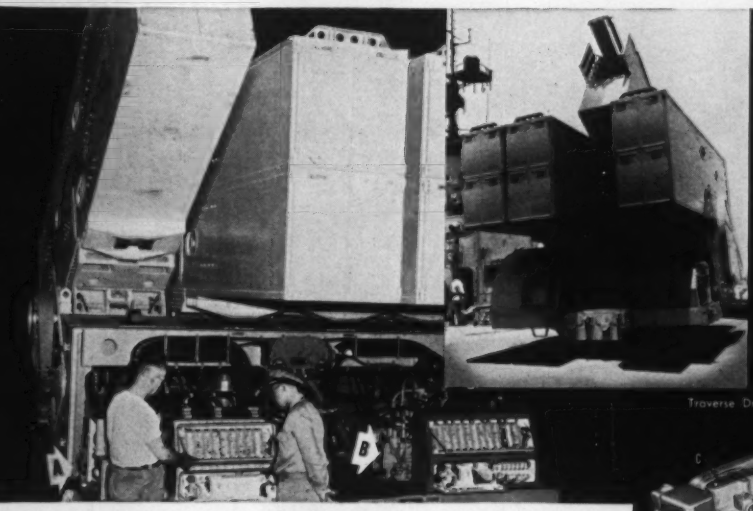
**ASROC (Anti-Submarine ROCket) — the Navy's deadliest, integrated, anti-submarine weapons system — consists of 4 major parts: an underwater sonar detection device; an electronic, digital, firecontrol (aiming) computer; a "pepper-box" type, 8-missile launcher; and ASROC missiles. Within seconds after sonar detection of a hostile submarine, the computer charts its course, speed, and range — correlated with the ASROC-equipped ship's course, speed, and roll. The resultant computer signals command the launcher to traverse and elevate instantly to accurate "aim" position, and continue to "track" from subsequent computer command signals. The ship commander merely pushes a button to fire either rocket-propelled, homing torpedos or depth charges.*

PROBLEM: Power and control for both the traverse and elevation drive systems to "aim" ASROC missile launchers in response to direct, low-power, electrical command signals from a digital firecontrol computer.

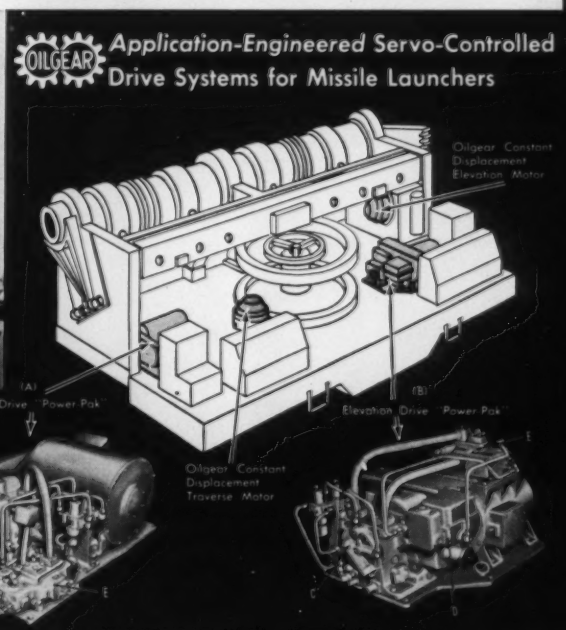
REQUIREMENTS: 1. High traverse and elevation speeds in either direction, with shockless reversal, to bring launcher "on target" — rapidly. 2. Fast, accurate control response for high-speed "homing." 3. Precisely controlled, low variable speeds for "tracking." 4. Entire drive and control systems to occupy a minimum of space within the launcher base. 5. Dependability — "no time-out permitted" — a rigid requirement for fleet use. 6. Unitized assemblies preferred, to facilitate installation and replacement.



Official Photos — U.S. Navy. Actual launcher performance data is classified information.

ABOVE: ASROC missile launcher being checked at U.S. Naval Ordnance Plant, York, Pennsylvania. Arrows indicate traverse (A) and elevation (B) Power-Paks. **INSET:** ASROC launcher ready to fire aboard U.S.S. Norfolk. Each of the 8 cells serve as missile stowage magazines and launchers — all traverse as a unit . . . each over/under pair of cells elevate individually. 360° launcher traverse is possible, but a quadrant is blocked to protect ship's superstructure. Missiles weigh about 1,000 lbs., are about 15 ft long. Launcher base sketch, right, approximates position of Oilgear Drives.

SOLUTION: With Oilgear's experience in meeting the speed, control, and precise turret and gun performance requirements for U.S. Army tanks, howitzers, and anti-aircraft guns — this missile launcher application was a "natural" for Oilgear *ANY-SPEED* Drives — and the alert, accurate response of Oilgear's Electrohydraulic Servo-Valve-Controlled, Two-Way, Variable Displacement Pumps. Amplified signals up to 5-watts actuate drive controls. Cushioned, full-speed drive reversal. These small, rugged, Oilgear *ANY-SPEED* Pump and Motor Drives easily convert output from constant speed electric motors into the exact, required traverse and elevation speeds, direction, and torque . . . even under high overload conditions. An automatic feedback control compensates for load, voltage, or viscosity changes to accurately maintain computer-selected speeds. Torque transmitted automatically increases or decreases to a point just sufficient to overcome resistance. There's no "wire-drawing," or bypassing of fluid to generate heat or waste power. Both systems are totally enclosed, automatically protected against overload, pressure and flood lubricated to assure long, dependable, maintenance-free, service life.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Oilgear Constant Displacement Elevation Motor
(A) Traverse Drive "Power Pak"
(B) Elevation Drive "Power Pak"
Oilgear Constant Displacement Traverse Motor
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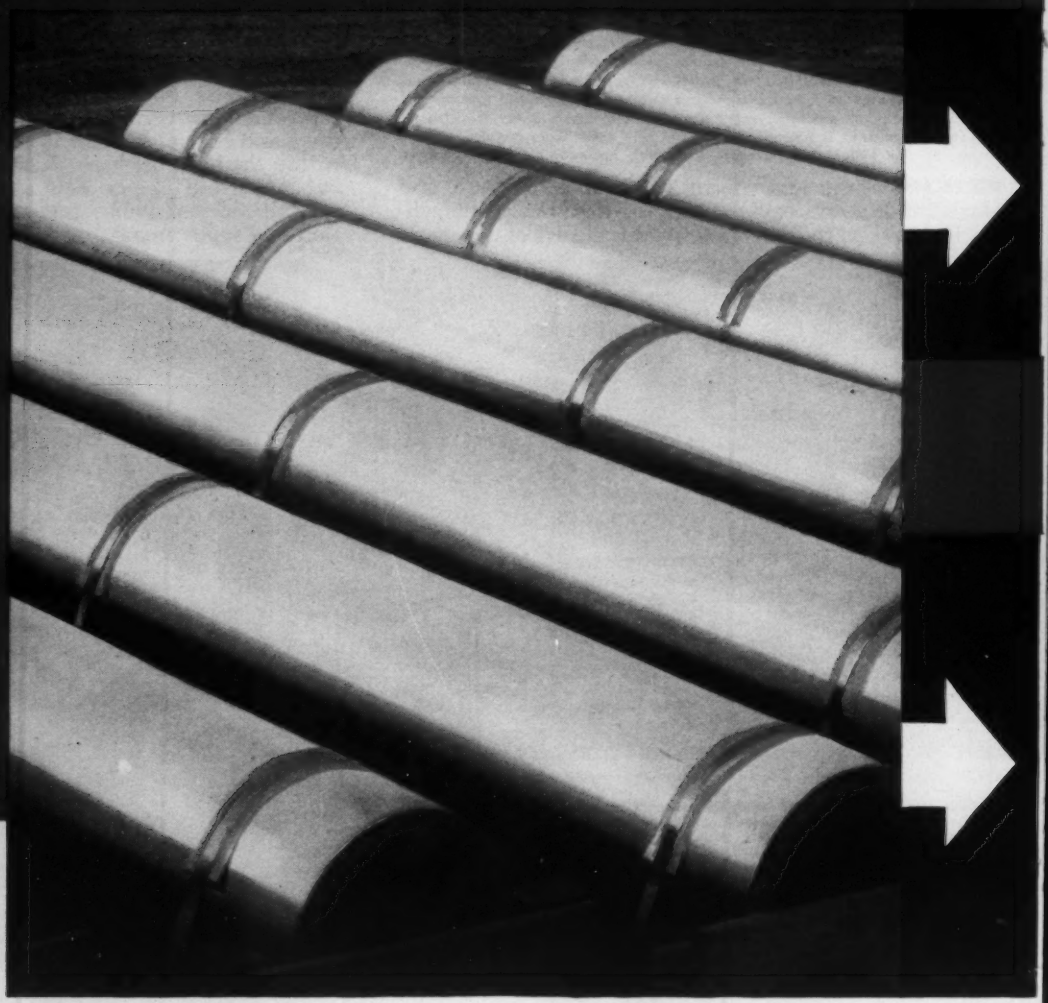


Centrifugal stainless steel castings readied for shipment by U.S. Pipe

The Government's new SPERT III nuclear plant at the National Reactor Station near Idaho Falls, Idaho, operating since December, 1958 to study nuclear reactor safety, uses U.S. Pipe's centrifugally cast stainless steel pipe for its coolant system.

SPERT III is classified as a high pressure, high temperature, light water moderated and cooled reactor. Its versatility permits transient tests under various initial conditions of pressure, temperature, and coolant flow. For example, pressures ranging from atmospheric to 2,500 psi and water temperatures from 68° to 668° F.

Another new nuclear power plant, engineered and constructed by Stone & Webster for Yankee Atomic Electric Company, is using centrifugally cast stainless steel heat exchanger shells made by U.S. Pipe and fabricated by the Southwestern Engineering Company in Los Angeles, Calif.

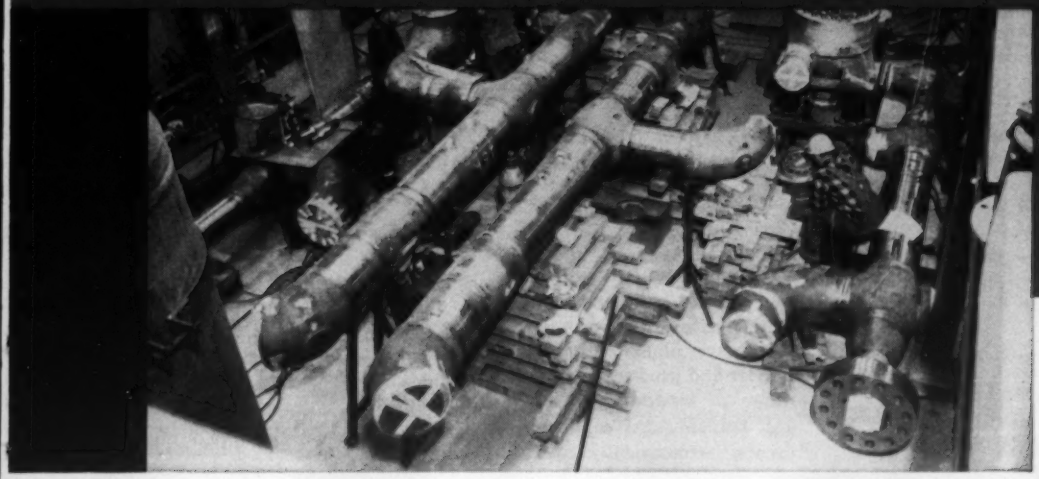
Stainless steel, centrifugally cast, made to rigid specifications, may be the answer to your piping or heat exchanger problem. For more information, write or call:

centrifugally cast stainless

REQUIREMENTS OF NUCLEAR AND COOLANT SYSTEMS

Shop-fabricated heat exchanger shells of centrifugally cast stainless steel ready for shipment to the Yankee Atomic Electric plant at Rowe, Mass.

Subassemblies of primary coolant piping of centrifugally cast stainless steel being installed in SPERT III.



ASA PRESSURE PIPING CODE STATUS

Approval has been granted under this code for the use of centrifugally cast austenitic pipe for nuclear piping by Nuclear Case N-8. This case appeared in the April, 1960 issue of MECHANICAL ENGINEERING. Reprints on request.

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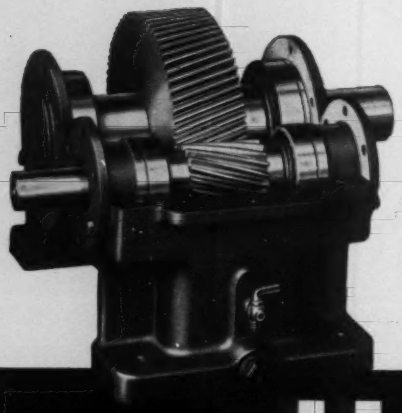

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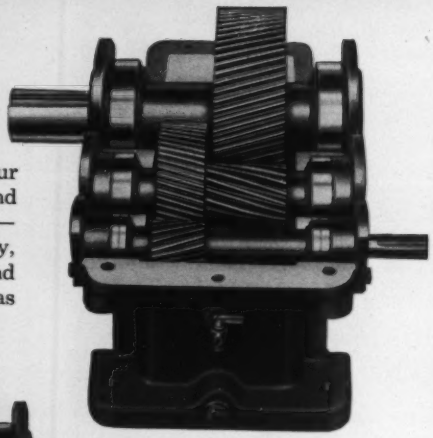

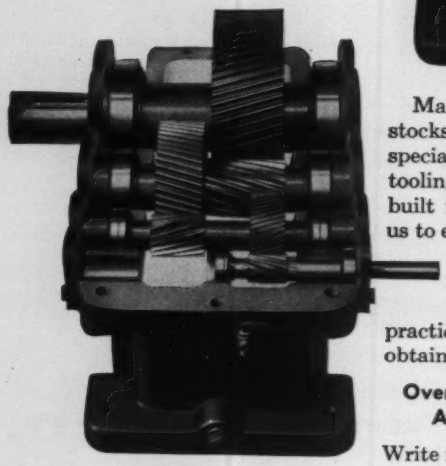

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CALENDAR OF MEETINGS

June 21, Electric Overhead Crane Institute: Meeting, Detroit Athletic Club, Detroit. Institute's address: 1 Thomas Circle, Washington 5, D. C. Executive secretary: J. H. Peritz.

June 21-24, National Tool, Die & Precision Machining Association: Summer meeting, Schroeder Hotel, Milwaukee. Association's address: 907 Public Square Bldg., Cleveland, Ohio. Executive secretary: Charles R. Bender.

June 22-23, Refractories Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

June 22-24, American Foundrymen's Society: Pennsylvania State regional foundry conference, Pennsylvania State University, University Park, Pa. Society's address: Golf & Wolf Roads, Des Plaines, Ill. General manager: W. W. Maloney.

June 25-30, American Society for Testing Materials: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Thomas A. Marshall Jr.

June 26-27, American Vacuum Society Inc.: Annual conference on vacuum metallurgy, New York University, University Heights Campus, New York. Society's address: Box 1282, Boston 9, Mass. Secretary: Harold C. Weingartner.

June 28-30, American Society of Mechanical Engineers: Joint automatic control conference, University of Colorado, Boulder, Colo. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

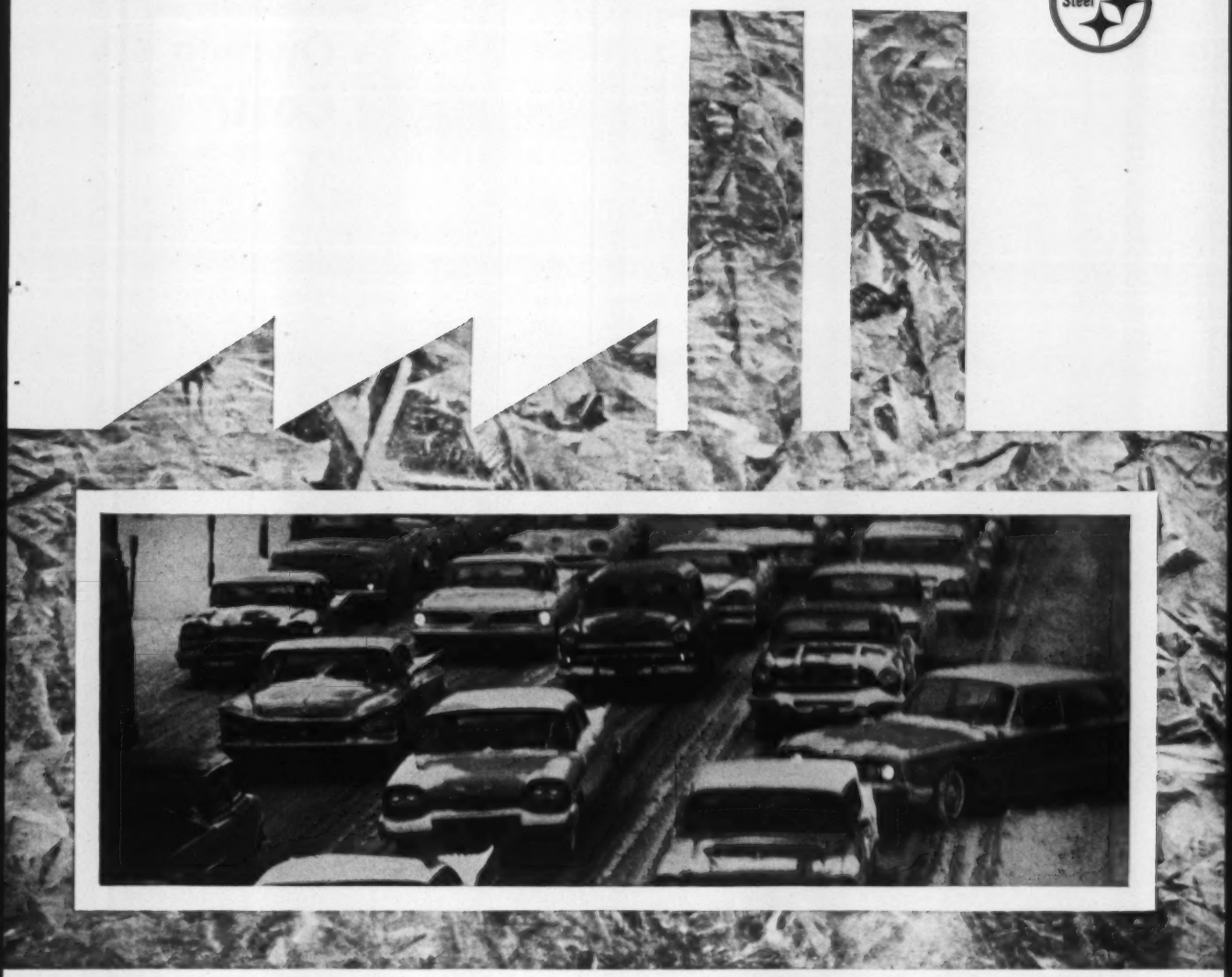
July 18-20, Western Plant Maintenance and Engineering Show and Conference: Pan Pacific Auditorium, Los Angeles: Information: Clapp & Poliak Inc., 341 Madison Ave., New York, or the San Francisco office, 681 Market St.

Aug. 15-17, Cryogenic Engineering Conference: University of Michigan, Ann Arbor, Mich. Conference secretary: K. D. Timmerhaus, Department of Chemical Engineering, University of Colorado, Boulder, Colo.

Aug. 16-19, Society of Automotive Engineers: National meeting, West Coast, Sheraton Hotel, Portland, Oreg. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Aug. 22-25, Western Electronic Show and Convention: Cow Palace, San Francisco. Convention director: Calvin K. Townsend. Business office: 1435 LaCienega Blvd., Los Angeles 35, Calif. Northern California office: 701 Welch Rd., Palo Alto, Calif.

The new generation of U.S. autos fends off corrosion . . .



GUARDED BY GALVANIZED STEEL

Use of galvanized steel sheets in the automotive industry has increased by more than 700% since 1954—and more automotive applications are on the way.

As a result of this growing addition to Detroit's diet, both consumers and manufacturers are benefiting. To car owners, every pound of galvanized steel means more complete corrosion protection, added durability and savings in maintenance. To manufacturers, galvanized steel's simplified fabricating procedures bring reduced costs. Head and tail lamp housings, for instance, formerly required five or six steps when zinc plated or painted after stamping. Now they are moved direct from press to assembly line with their tight zinc coatings completely undamaged by fabrication. This also applies to side members, rocker panels, front and rear rails and cross members.

WEIRKOTE, IN PARTICULAR! One of the leading galvanized steels, Weirkote is widely used in the latest model automobiles. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, it can be worked to the very limits of the steel base without chipping or peeling. And it assures you long-lasting protection against corrosion. It is manufactured by two National Steel divisions, Weirton Steel Company and Midwest Steel Corporation. Write Weirton Steel Company, Weirton, West Virginia, for further Weirkote details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

divisions of
NATIONAL STEEL CORPORATION

Figure both to keep your steel costs low

You can keep your steel costs low only when you look beyond steel's low initial price. Recognize how much unnecessary—and often hidden—costs of possession can add to your *final* costs. By using the facilities of your steel service center you frequently can minimize or eliminate the extra expenses of storing, handling and readying steel for use.

Each steel user's case is different. Your steel service center will be glad to help you determine the most economical way to buy steel. Figure all your costs of possession, such as:

Cost of capital:	Cost of operation:	Other costs:
Inventory	Space	Obsolescence
Space	Material handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

Call your nearby steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE
540-G Terminal Tower, Cleveland 13, Ohio

Steel

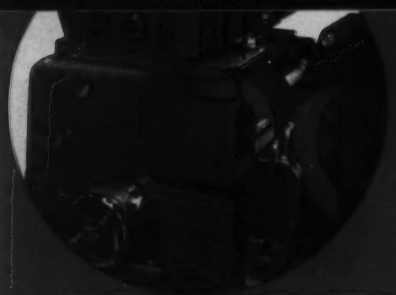
Four outstanding advantages of the allNEW Landis Centerless Grinder

This completely new 12R machine is the finest centerless grinder available anywhere in the world. It will grind parts at a faster rate and to even closer tolerances than was possible before.

LANDIS

world leader in precision grinders

LANDIS TOOL COMPANY, WAYNESBORO, PA.

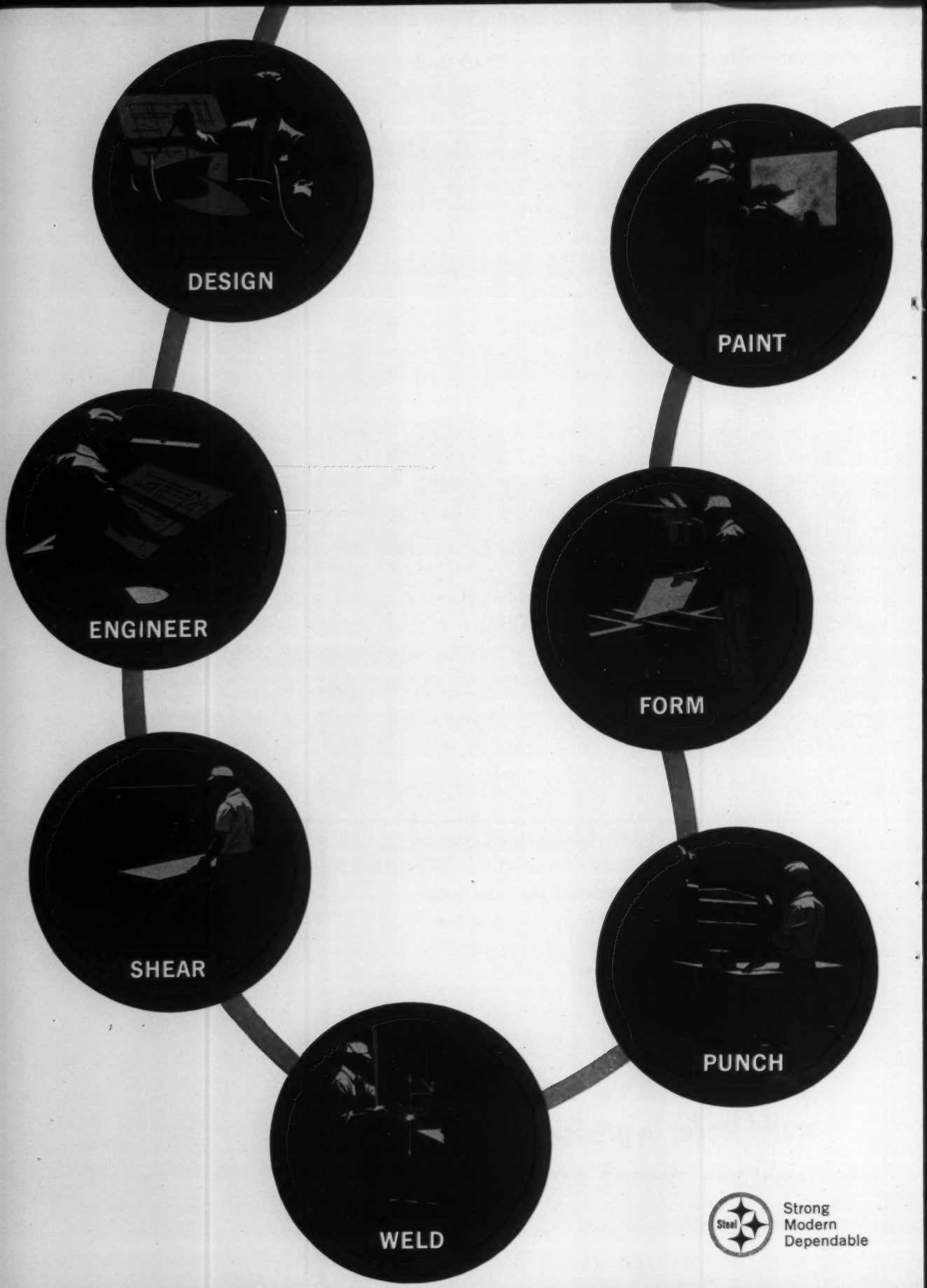


Faster grinding cycles with exclusive Landis Lockspeed regulating wheel drive.

New dressing accuracy . . . Landis Truform dresser gives exact duplication of the profile on the wheel.

Greater machine stability . . . surface plate ribbing of cast bed maintains perfect alignment of ways for both wheelheads.

Close tolerances . . . work rest solidly mounted on bed with support directly to the base for heavy stock removal.


DESIGN
ENGINEER
SHEAR
WELD
PUNCH
FORM
PAINT
Steel
Strong
Modern
Dependable

FROM DESIGN THROUGH FINISHED PRODUCT

Republic saves you money on sheet metal fabrication, every step of the way

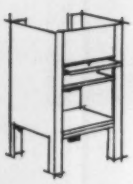
A skilled design and engineering staff . . . complete production facilities that include modern assembly lines for shearing, punching, forming, welding, Bonderizing, painting, and packaging . . . diversified experience and problem solving know-how backed by over 50 years of specialization in sheet metal fabricating . . . these are key reasons why Republic's Berger Division can save money, produce a better quality product, meet delivery schedules, *for you.*

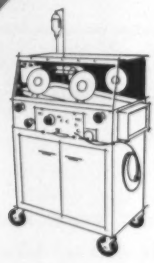
A tour of Berger's efficient plant points up another factor that keeps costs at rock bottom. Scientifically planned material flow is combined with straight-through production lines to eliminate excessive handling, speed fabrication, assembly, and delivery.

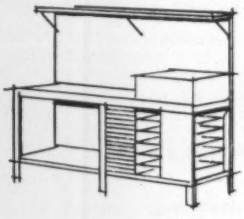
Most important, you can put this $5,000,000 fabricating facility to work for you without investing a dime . . . to make cabinets, housings, and components for the products you now produce, or to make new items that will round out your line. For complete details, price quotations, and delivery information, contact Berger's Contract Manufacturing Department today, or mail the coupon below.

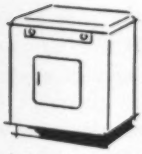
REPUBLIC STEEL

REPUBLIC HAS THE FEEL FOR MODERN STEEL









Typical products, fabricated for Berger customers from cold rolled carbon, galvanized, and stainless steels, Electro Paint-lok®, and vinyl coated sheets.

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BERGER DIVISION, DEPT. A-2350
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Company_____

Address_____

City_____ Zone____ State_____

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FLEXIBILITY... Bars and Rods, any size or shape produced to your specifications, regardless of quantity.

QUALITY... Forging and Cold Heading quality. The industry's most rigid inspection.

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Hodges Sets Up Ethics Advisory Group

With public confidence in management still shaken by conflict of interest and price fixing scandals, Secretary of Commerce Luther Hodges has organized a Business Ethics Advisory Council. He has asked this group of industrial leaders for its opinion "as to what tools business and industry can best use to pursue their search for the highest ethical performance." He hopes the council will teach and encourage management to use such tools so that faith in U. S. economic institutions will not be lost.

Surrey Plan to Be Changed

Commerce Secretary Hodges is privately advising industry that the Treasury Department's attempt to simplify the Surrey plan of income tax credits for capital investment should be accepted. Treasury wants to change the 15 per cent-6 per cent system to a flat 7 per cent credit, without reference to current levels of depreciation. That would affect more firms, be easier to administer, and not be open to the charge of helping one industry against another, or big firms instead of small ones. The House Ways & Means Committee was in executive session on the tax bill last week trying to work out some of those problems. Consensus: Unless there is a major change in industry's view of the Surrey system, the plan may not get out of committee. A new STEEL survey finds effective depreciation reform would give the economy a big lift (see Page 47).

Manage for Profit Growth

How do you get your managers to think in terms of profit rather than volume? How do you convince them that they must consider the long term implications of their actions? Answers to those questions and other tips on how to manage for profit growth are provided by Union Carbide Corp.'s John Paul Jones and other management experts in an article beginning on Page 53.

Kennedy Seeks Wide Revamp of Jobless Insurance

President Kennedy has sent to Congress a bill to overhaul the federal-state unemployment compensation system. It calls for: 1. A permanent program of extra federal payments for workers who have exhausted state benefits. 2. Extended coverage—offering UC to about 3 million more workers, chiefly in small firms. 3. Starting in 1964, states would be required to meet federal standards as to amount and length of benefits, or employers in those states could lose certain tax advantages. 4. "Equalization grants" would be provided to states with high benefit costs in any one year. To finance

the program, wages up to $4800 a year (instead of $3000) would be subject to unemployment tax and the temporary 0.8 per cent tax paid by employers would become the permanent rate.

'Cat's Whiskers' to Compete with 'Rabbit Ears'

This comely young lady holds a silver circuit, printed antenna for TV or FM made from B. F. Goodrich Koroseal. It can be installed, with thumbtacks, almost anywhere—for instance, under the rug. It's made by RF Industries Inc., Summit, N. J.

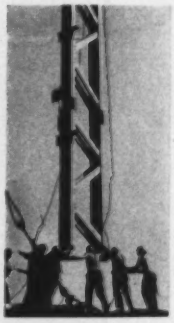
Want to Make Rifles? Here's Your Chance

The Army wants another supplier for its new M-14 rifle; its program is about 60 per cent behind schedule. The President has recommended authorizing $6 million for additional rifles. They cost $116 each. The Army wants a new source by September. It'll take about 15 months after that to tool up.

STEEL Uncovers J&L's Project R-101

Jones & Laughlin Steel Corp. is installing equipment at Aliquippa, Pa., to produce plastic coated pipe for gas transmission, STEEL has learned. This is the secret Project R-101 that the steelmaker has had in the works. J&L will use the Whirlclad coating system of Polymer Corp.'s Whirlclad Div., Reading, Pa., in which preheated pipe is coated by dipping it in a fluidized bed of plastic powder. The direct fusion of plastic and metal prevents "holidays" and underfilm migration.

Construction: Booming in the Sixties



"It is estimated that $600 billion will be spent in the next ten years on new construction of all types," reports Mark Cresap, president, Westinghouse Electric Corp. Metalworking stands to get a widening share of that market. For examples of the methods and materials that metalworking is using to capture a bigger share, and for data on new opportunities and problems in the construction industry, see STEEL's special report beginning on Page 43.

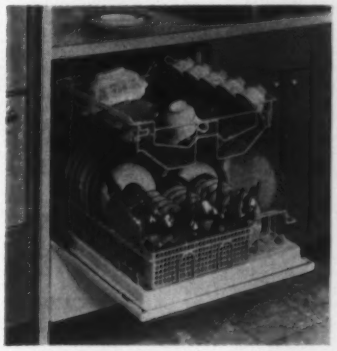
Electrical Industry Warned of Tougher Competition

Executives of the nation's electric utilities, gathered at the Edison Electric Institute's annual meeting, were warned against the concept of selling both gas and electricity by Philip Sporn, president of giant American Electric Power Co. He urged the executives to establish electricity as "the single energy source," and he warned that the gas industry has already embarked

on a program to develop a natural gas fuel cell that will "provide electricity right in the homes and factories." Meanwhile, C. S. Stackpole, managing director of the American Gas Association, told a Pittsburgh group that the home of 1971 might derive all its power from gas. Mr. Sporn also told the utility heads that the growth of public power has resulted from their own "lack of alertness to both opportunity and responsibility again and again."

Dishwashers: Bright Spot in Appliances

During the first four months of this year, the appliance industry sold 193,700 electric dishwashers—3 per cent more than in the like 1960 period. Dehumidifiers represent the only other electrical appliance with 1961 sales running ahead of 1960's. Sales of ranges, water heaters, and food waste disposers are within a few percentage points of 1960 levels, the National Electrical Manufacturers Association reports.



Tape System Measures Precision Parts

Sheffield Corp. last week unveiled a 16 ton system that is commanded by a roll of punched tape and can complete nearly 1000 precision measurements in 2 hours. The gage can automatically measure wall thickness to an accuracy of 50 millionths of an inch. The machine can do in 2 hours what might otherwise take more than 125 hours, says Sheffield.

Upside-Down Welding Eliminates Inclusions

Upside-down welding may help to eliminate inclusions in many fabricated products. It has done that in tubemaking for Crucible Steel Co. of America's subsidiary, Trent Tube Co., East Troy, Wis. Welding with the electrode on the underside of the workpiece prevents molten contaminants from flowing down into the weld. The process leaves a weld contour that closely approximates that of the parent metal.

Will Ceramics Make MHD Power Practical?

A team of Westinghouse Electric Corp. scientists has been evaluating materials for use in magnetohydrodynamic generators (where a plasma replaces the copper conductors used in conventional power generation). Dr. S. W. Herwald, vice president-research, reports that magnesium oxide performs well as a generator lining material. Zirconium oxide also showed good endurance. He says zirconium silicate and beryllium oxide were found to be less satisfactory. No satisfactory material has yet been found for MHD electrodes, which are subjected to the full heat and blast of the gas stream (as

STEEL The Metalworking Weekly

June 19, 1961 Vol. 148 No. 25

CONTENTS

THE EDITOR'S VIEWS:
Open to the Public? 39

WINDOWS OF WASHINGTON:
Hassle Over Patents Looms 50

MIRRORS OF MOTORDOM:
How Plastic Corvette Is Built 59

THE BUSINESS TREND:
Metalworking Rise Lags Economy .. 63

NEWS SECTION:
Metals Vie for Builder's Dollar ... 43
Effective Depreciation Reform Would Give Economy a Big Lift .. 47
Capital Spending to Slip in '61 48
Profit Squeeze to Continue—PAs .. 48
Machines Act on Written Word ... 49
Program for Management—Manage for Profit Growth 53
Continental Copper Gets New Mill .. 73

TECHNICAL SECTION:
Technical Outlook 87
Composite Wire Withstands Flexing 88
X-ray Takes Turn for the Brighter .. 90
Technique Buffs Beauty into Strip .. 92
Pressure Vessels Made from Tape .. 93
Upside-Down Welds Expel Inclusions 94
Progress in Steelmaking—Sendzimir Mills Roll Thin Tin Plate 96
Crane Ups Heat Treat Capacity ... 102
Changes Speed Casting Process .. 106
Stainless Element Cleans Jet Fuel .. 107

MARKET SECTION:
Market Outlook 123
Complete Index to News and Prices 123
Stainless Steel Distribution—1967 125
USS Recalls Posted Rebar Prices .. 126
Inland Starts New Galvanizing Line 127
Service Center Stocks Up in May .. 128
District Ingot Rates and Chart 130
Scrap Levels Off with Steel Rate .. 144
Steel Shipments Gain in April 145
Nonferrous Metals—1961 Looks Better All the Time 148

DEPARTMENTS & INFORMATION:
Servicenter 5
Editorial and Business Staffs 6
Calendar of Meetings 10
Metalworking Week 17
Metalworking Pulse 20
Men of Industry 67
New Products 111
New Literature 118
Advertising Index 153

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hot as 5000° F and traveling at speeds up to 2000 mph) and cannot be water cooled.

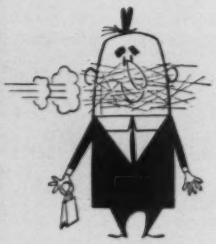
'Layer Electronics': New Field for Growth

Electroluminescent devices used as integral parts of computers and industrial control systems will represent one form of "layer electronics," which General Telephone & Electronics Corp. calls "the highly promising new branch of chemical-electronics."

Canadian Steelworkers Demand Layoff Guarantee

Canadian steelworkers are demanding extended Supplemental Unemployment Benefits in their opening contract talks. The United Steelworkers of America proposed that Steel Co. of Canada guarantee all laid-off employees 65 per cent of their earnings for up to one year. One local wants the company to pay 13 weeks of wages to pensioners at retirement. Another demand: "Substantial" wage increases.

Straws in the Wind



Heavy construction contracts awarded during the second week in June shot up to $662 million for the biggest week in 12 months, reports *Engineering News-Record* . . . Steel industry employment increased during April for the third consecutive month—to a total of 501,323 hourly and salaried workers . . . The United Steelworkers of America celebrated their organization's silver anniversary last Saturday (June 17) . . . Boeing Airplane Co. expects to sell an additional $60 million worth of commercial jet transports in Europe this year . . . 114 labor market areas in 29 states and Puerto Rico have been designated redevelopment areas; as soon as they have an approved over-all economic development plan, they may become eligible for federal financial and technical assistance . . . Gray Iron Founders' Society reports the industry operated at 71 per cent of capacity in May vs. 60 per cent in April; the forecast for June is "about the same" as May . . . Aluminum Co. of America has embarked on a $10 million aluminum venture in Australia, in which it will hold a 51 per cent interest. The complex will be an integrated mining-to-metal-to-fabricating facility.

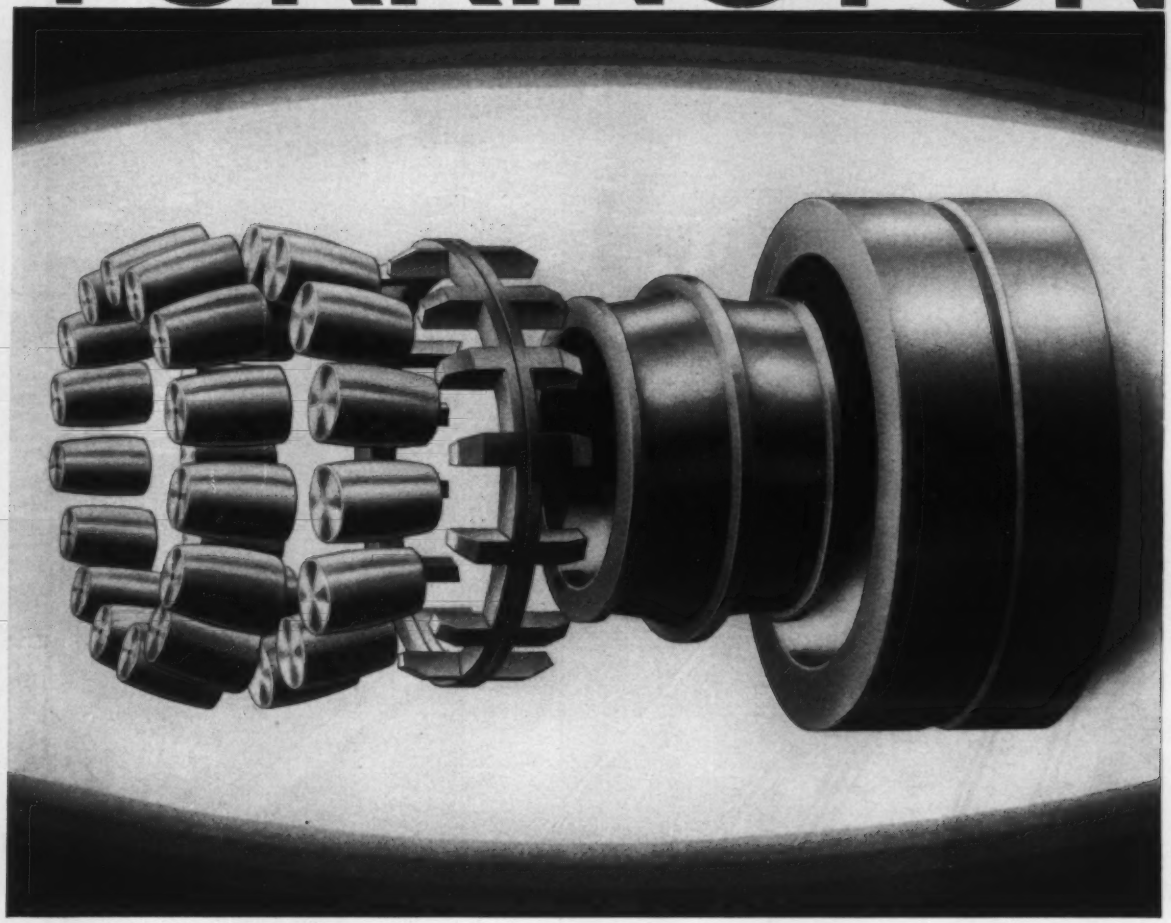
Metalworking Pulse

The Business Trend: STEEL's industrial production index regained all of the ground it lost during the Memorial Day week. At a preliminary 165 (1947-49=100) for the week ended June 10, it matches the previous high for 1961. **Autos:** Brisk May sales have assured steady production in June at about the May pace of close to 500,000 units. **Steel:** After rising steadily since mid-March, ingot output appears to be slowly leveling out.

- **INDUSTRIAL PRODUCTION INDEX** (1947-49=100)
  - Week ended June 10 . . . 165†
  - Year ago 157
  - Details on Page 63
- **PASSENGER CAR OUTPUT (UNITS)**
  - Week ended June 17 . 125,000*
  - Year ago 137,641
  - Details on Page 80
- **STEEL INGOT OUTPUT (TONS)**
  - Week ended June 17 2,030,000*
  - Week ago 2,042,000
  - Details on Page 130

†Preliminary. *Estimated.

TORRINGTON



FOR THE INSIDE STORY...

...ON TORRINGTON SPHERICAL ROLLER BEARINGS, one word: *precision*. Each individual part is precision-engineered to the highest standards in the industry...functions precisely and efficiently with all other parts.

Every roller is matched electronically within .0001" for even-load distribution and maximum capacity.

Each independent land-riding cage spaces rollers precisely...prevents roller drag even under the heaviest loads and possible misalignment.

The integral guide flange is ground to a common spherical radius with the roller ends for positive roller guidance, greater stability.

For minimum friction and wear, both inner and outer races are precision ground to conform exactly to roller contours.

Put together...a Torrington Spherical Roller Bearing for superior performance, reliability and long service life. Buy the best...specify Torrington.

SUPERIOR PERFORMANCE FEATURES OF TORRINGTON SPHERICAL ROLLER BEARINGS

- ☐ inherent self-alignment
- ☐ conformity of rollers to raceways
- ☐ integral center guide flange for stability
- ☐ positive roller guidance
- ☐ land-riding bronze cages
- ☐ maximum radial and thrust capacity
- ☐ controlled internal clearance
- ☐ electronically selected rollers
- ☐ even load distribution
- ☐ long, dependable service life

progress through precision

THE TORRINGTON COMPANY

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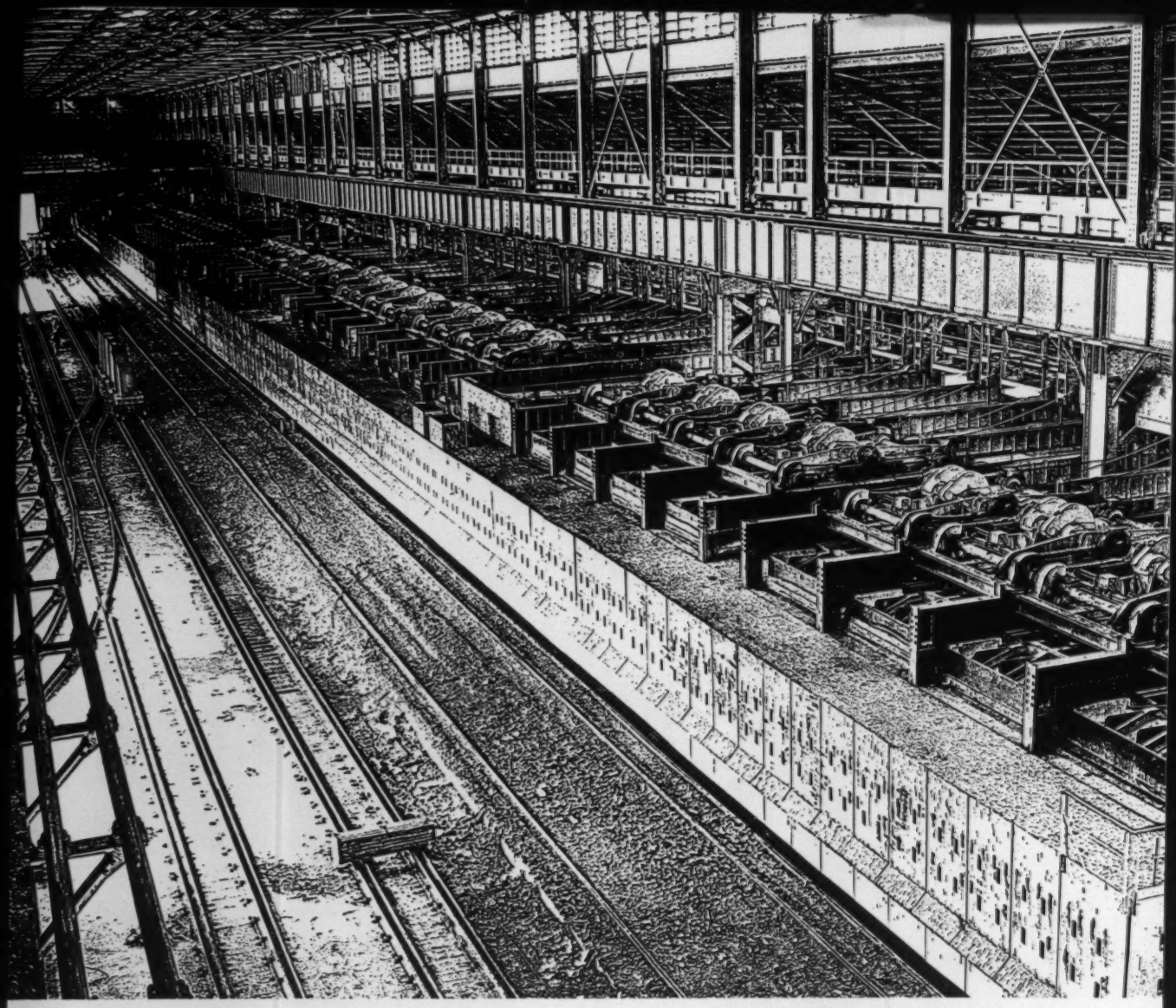
South Bend 21, Indiana • Torrington, Connecticut



Courtesy of Gary Works, U.S. Steel Corporation

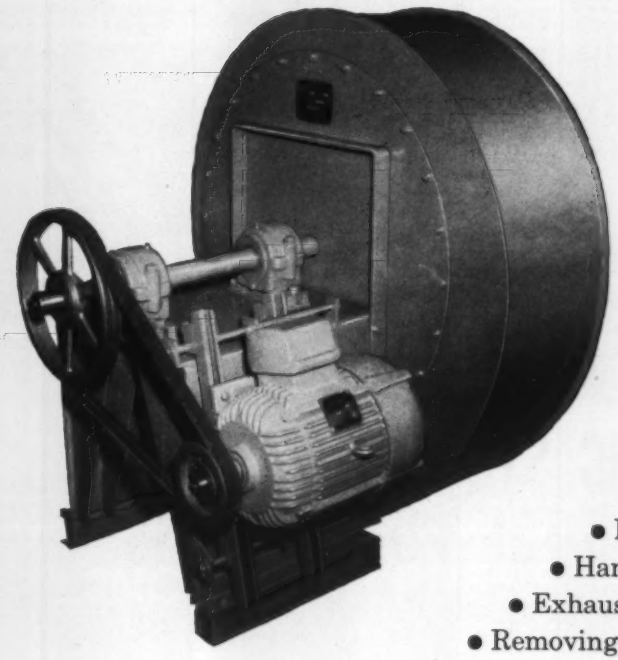
Gets them out the back door (750 tons/hr) This is the largest installation of soaking pits (48) ever built at one time. Engineered by Surface, it will heat an average of 750 tons per hour. At peak capacity, it loads the ingot buggies at a rate of 1200 tons per hour. A dual recuperator system applies the maximum amount of heat where it belongs—inside the pit. Address inquiries to 2408 Dorr St., Toledo 1, Ohio.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR

HOW TO HANDLE SOME OF THE MOST

PUNISHING AIR JOBS



IN THE MILL

- Moving hot gases.
- Handling materials in conveyor systems.
- Exhausting corrosive fumes.
- Removing dust-laden air.

'BUFFALO' INDUSTRIAL EXHAUSTERS

Wherever you find a punishing air job, you're very apt to find a hard-working 'Buffalo' Industrial Exhauster at work. Available with highly efficient air wheel (type AW), front-flanged material wheel (type MW), or open material wheel (type OW) without front flange.

Hot gases, from 200° to 850° F., are being removed successfully by special 'Buffalo' Industrial Exhausters with shaft heat slingers.

Where corrosive fumes would quickly put an ordinary fan out of service, rubber-lined 'Buffalo' Exhausters are handling them with major savings in fan replacement costs.

Next time you have a tough air moving job, call in your resident 'Buffalo' Engineering Representative. He has the experience to recommend the right fan for the job.

"Buffalo"

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Buffalo, New York

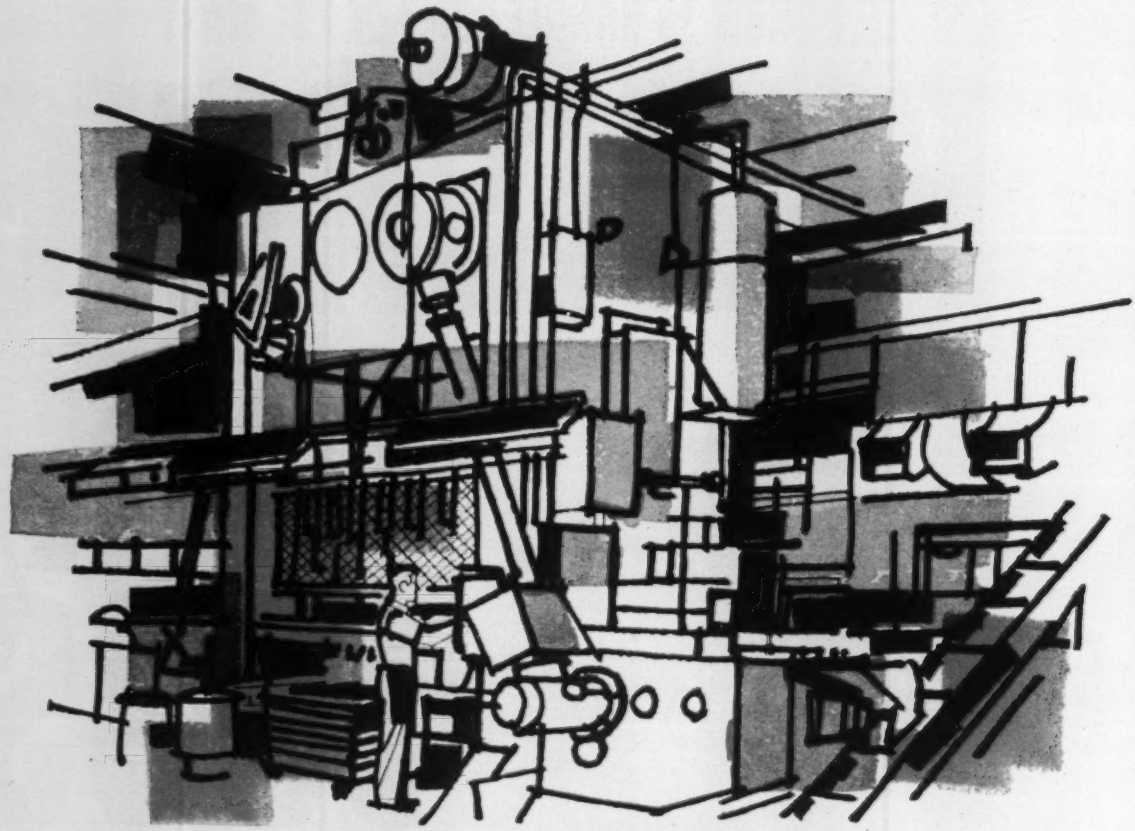
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

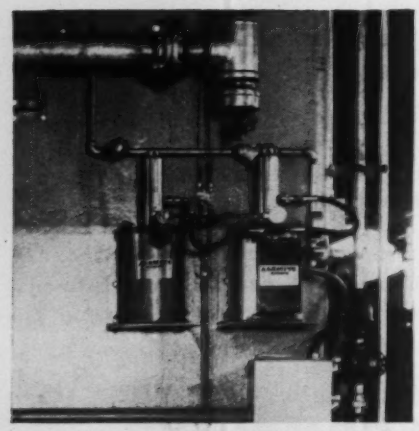
'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.



ALEMITE ACCUMATIC SYSTEM LUBRICATES 300-TON PUNCH PRESS

Automatically...in seconds!



An Alemite Accumatic Centralized Lubrication System lubricates the key points on this 300-ton, 20-foot high Punch Press which can produce 1200 completed stampings per hour at 25 strokes per minute, based on 80% efficiency.

Complete with pump, metering valves, supply lines and controls, this Accumatic system offers all these advantages: It automatically meters out the exact amount of lubricant needed at each bearing on a predetermined cycle . . . never over- or under-lubricates. Guarantees lubrication of those out-of-the-way bearings frequently overlooked; protects against bearing wear due to neglect. Services *all* bearings in a single operation . . . in seconds . . . while the machine is running eliminating work stoppage . . . adding production hours to each day.

This installation is typical of the versatility and wide range of Accumatic's precision lubrication . . . typical of how Alemite's experience and products work together to provide the right lubrication system for machines of all types and sizes. Today, find out how Alemite and Accumatic can do a *big job for you,* too! *Send for free illustrated literature . . . or contact your Alemite representative.*

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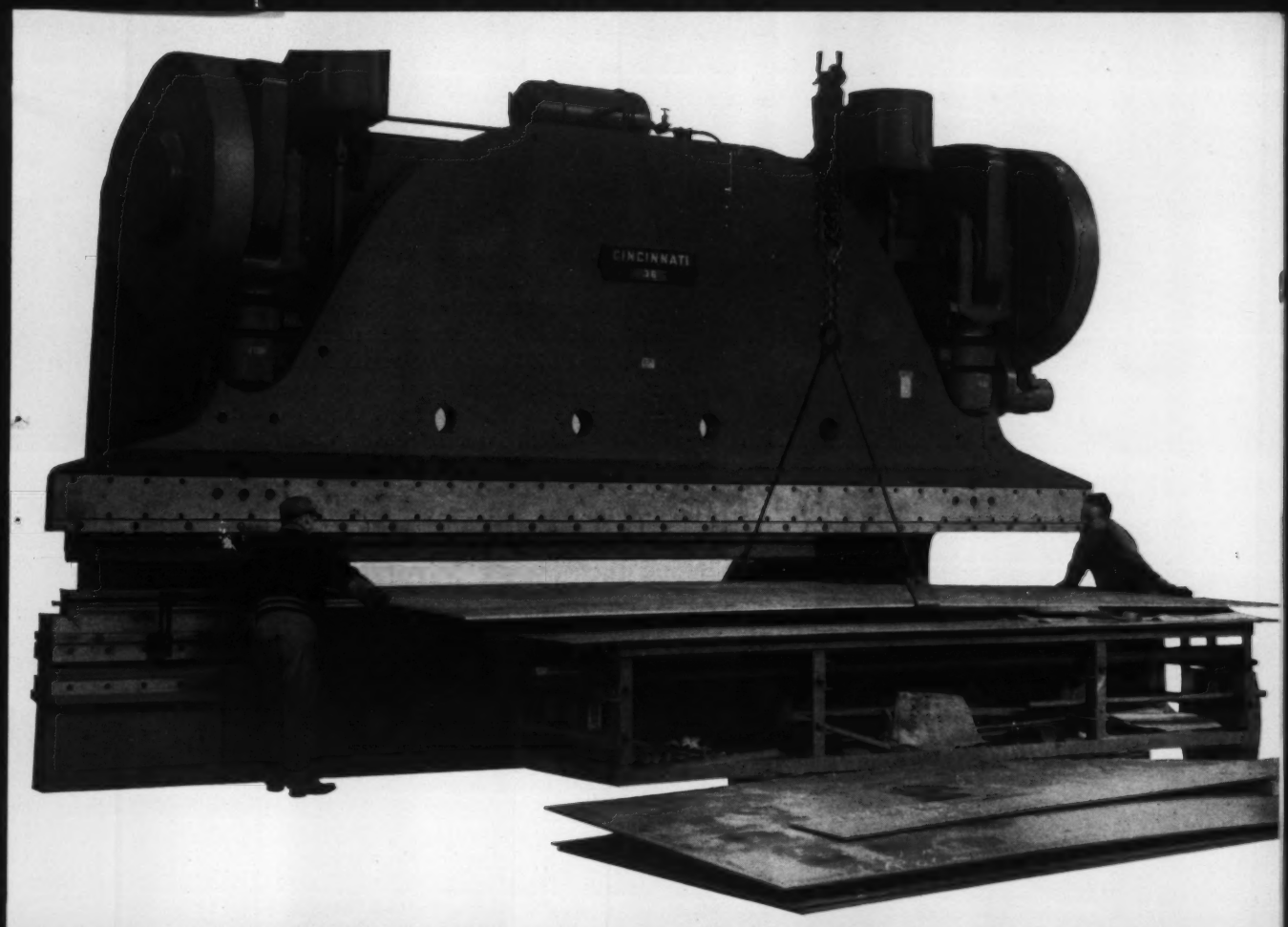
In Canada: Stewart-Warner Corporation of Canada Ltd., Belleville, Ontario

Dept. E-61, 1850 Diversey Parkway, Chicago 14, Illinois



CINCINNATI® PRESS BRAKE

gets new business

Bigger jobs, fewer welded seams, less handling, and easier operation—McGregor-Michigan Corporation gets all four advantages from this 36 Series Cincinnati Press Brake.

As a result, "this new brake . . . helps us be more competitive with some of the larger shops," says R. Hilprecht, sales manager of this steel plate fabricating shop.

This is another example of the way Cincinnati Press Brakes and Cincinnati Shears are reducing costs and opening up new business for shops across the country. If you don't have the new catalogs on these machines, both mechanical and hydraulic, please write for them.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

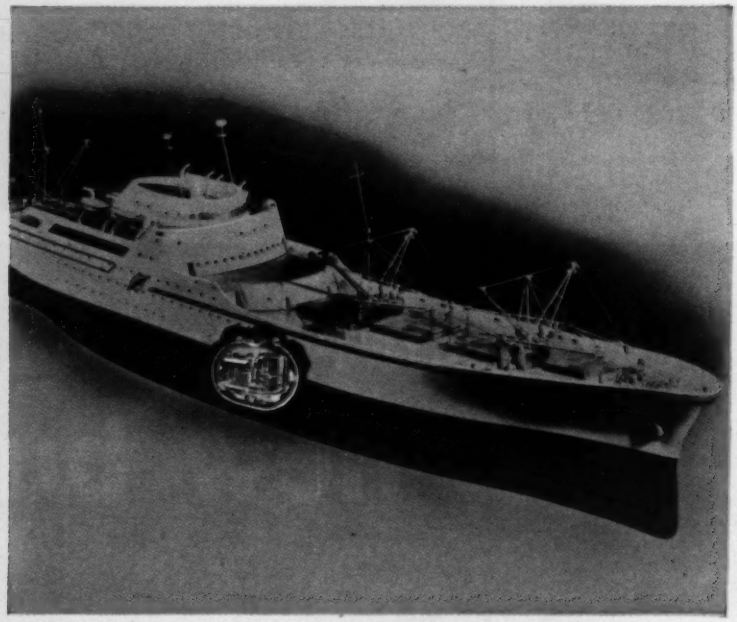
Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

A company's reputation hangs on many things, including door hinges. This washer maker uses Stainless 430 Wire from Carpenter Webb Wire Division.

World's largest submarine, 447-foot, 5900-ton, atom-powered Triton, serves as early warning station for U.S. Navy task forces. Incorporated into its design for extra reliability are periscope mountings forged from Carpenter Stainless No. 4A (Type 304) Steel.

Family begs for eggs, thanks to this automatic skillet. Carpenter Low Expansion "42" Alloy in thermostat assures even temperatures...and tempers.



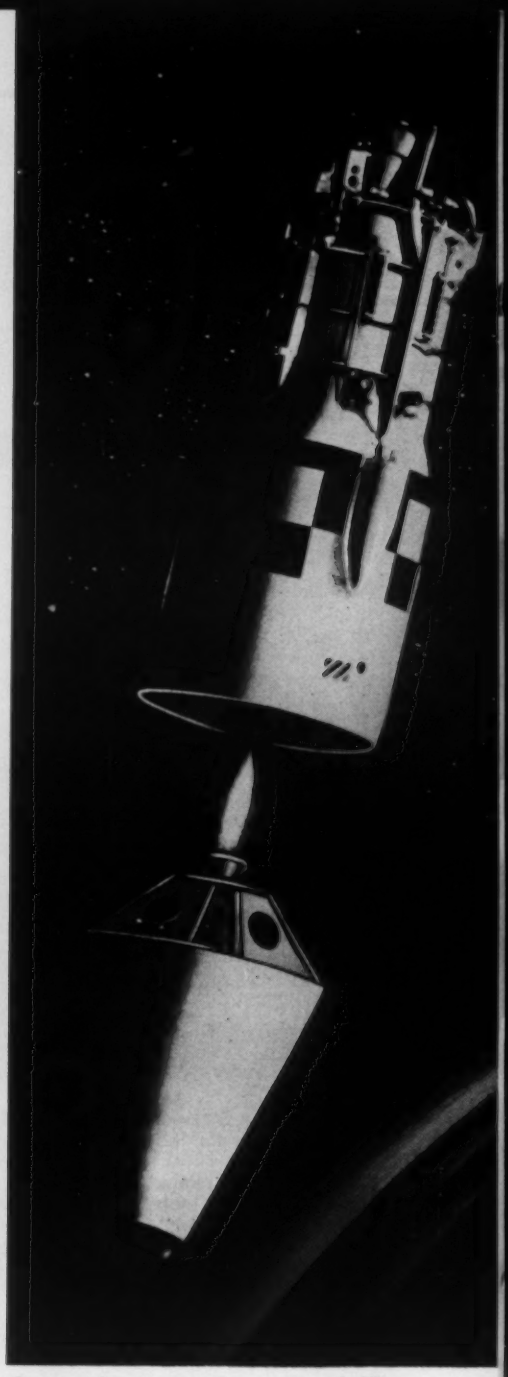
World's first nuclear-powered merchant ship, N.S. Savannah, will cruise for over 350,000 miles on one atomic fueling. The fuel assemblies for the Savannah power reactor contain 121 fuel rods clad in dependable Carpenter Type 304 Stainless Tubing.

Steel **you can do it consistently better with**

The Carpenter Steel Company, Main Office and Mills, Reading, Pa. / Export Dept., Port Washington, N.Y.—"CARSTEELCO"

Everything adds up... to extra reliability in this famous-make bookkeeping machine. Contributing to its reliability are components shaped from Carpenter TGS Tool Steel. Again and again, wherever you find reliability a factor, Carpenter is first choice.

Research that profits you! From Carpenter's metallurgical laboratories come new tool steels to meet the demands of industry. Latest example: HI SHOCK 60 for applications involving extreme shock resistance. Now stocked for immediate deliveries.



Sets the pace in space! The "Discoverer" scores high on predictable performance. Used forgings of Carpenter High Temperature N-155 Alloy.

Carpenter Specialty Steels for Specialists

Alloy Tube Division, Union, N.J. / Webb Wire Division, New Brunswick, N.J. / Carpenter Steel of New England, Inc., Bridgeport, Conn.

1000 Tons High Alloy Steels
PRECISION-SHEARED Monthly

1/16" to 1-1/8" Thicknesses Cut Efficiently on Steelweld Shear

Steelweld mechanical shear No. 24GA-12 cutting a 9/16" x 124" plate of 304 chrome nickel.

Some interesting details of this machine:

Capacity 1½" x 12'-0" mild steel — 8" stroke — 21 strokes per minute — 48" motorized back gauge — 20'-0" squaring gauge arm — 7'-0" front gauge outriggers — slitting guide — centralized lubrication system — air-operated ball transfers.

Adjusting gap between knives to provide correct clearance for plate thickness being cut. This adjustment is made in seconds, not hours, as required for some shears. Indicator has scales reading in plate thicknesses and in thousandths of an inch knife clearance. Note convenient up-front location of this important feature.

Addition of a Steelweld Shear boosted shearing capacity tremendously for Jessop Steel Company, Washington, Pa. More than 1000 tons of fine quality stainless, tool, high-speed and related alloy steels for which this 60-year old producer is noted, are sheared monthly on this machine — and every cut is sharp, straight, accurate.

The shear works continually 16 hours a day, 5 days a week, cutting thicknesses from 1/16 to 1⅛ inch. Frequently plate up to 240 inches long are slit by use of the Steelweld slitting arrangement.

The three Steelweld features most impressive to Jessop officials are:

1. The fast easy knife adjustment which can be quickly set to provide the best cut for every plate thickness.
2. The immediate, positive operation and long trouble-free life of Steelweld's air-cooled clutch and brake.
3. The massiveness and rigidity built into the frame and all working parts.

Jessop Steel has found that knives last three times as long on its Steelweld because of the knife adjustment feature. This means an important saving in knife costs, as well as a big reduction in down-time normally required for rotating or changing knives.

"A very fine operating shear" . . . "A machine that is doing a good job for us" . . . These are some of the comments of Jessop Steel production executives.

Steelweld Shears are available in all sizes for cutting steel plate to thicknesses of 2" and in lengths to 30'-0".

Write for free copy of catalog No. 2011

STEELWELD

PIVOTED BLADE *Mechanical and Hydraulic* **SHEARS**

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7864 E. 282 ST. • WICKLIFFE, OHIO

Photo by Courtesy of Weirton Steel Division of National Steel Corporation

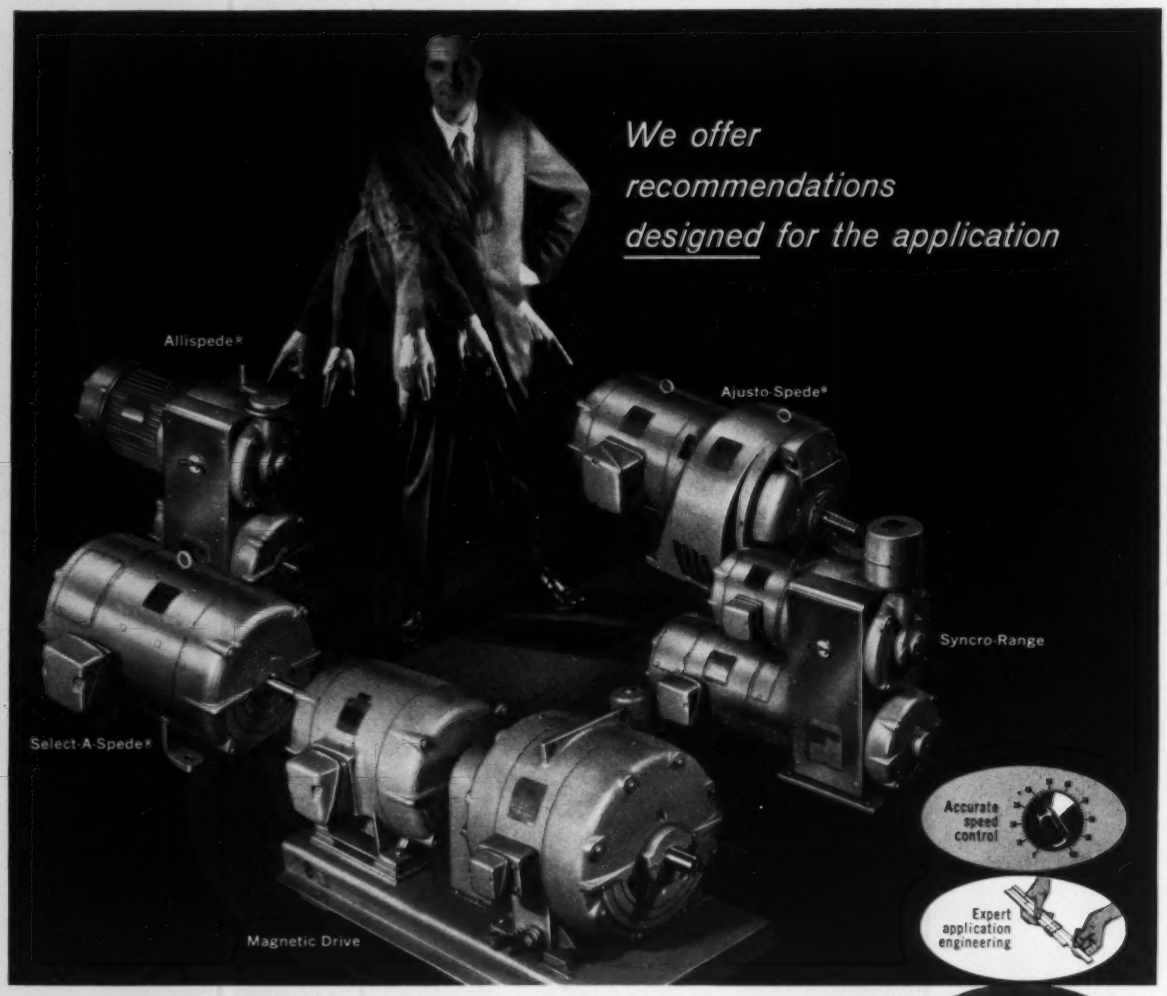
How does your slag go to pot?

with Mack-Hemp pots the choice is virtually unlimited

we'll fit size and shape to your need.

MACKINTOSH-HEMPHILL • Division of E. W. BLISS COMPANY

Pittsburgh and Midland, Pa.



An outstanding line of LOUIS ALLIS adjustable-speed drives from ½ to 2500 hp.

Louis Allis offers you a complete line of adjustable-speed drives with various characteristics for every application where adjustable speed is required.

Experienced Louis Allis field engineers, supported by regional and factory industry specialists, will help you select the best drive or drive system to meet *your* requirements.

The Louis Allis line of drives provides outstanding control features ranging from simple manual to precise electronic or transistorized control. Selection of control varies, of course, with the nature of the installation and the precision required. Where desirable, speed regulation as close as .1% is obtainable.

Controls can be provided which automatically respond to temperature, pressure, or flow. Other control features include threading, inching, jogging, logarithmic acceleration, torque-limit acceleration, tachometer feedback... and many other control provisions that can exactly tailor a Louis Allis drive to *your* operation.

For process plants or applications involving inter-related motors and multiple drives, Louis Allis engineers can provide complete "systems engineering," furnishing all electrical rotating components and control.

For expert assistance, call your local Louis Allis District Office listed in the Yellow Pages under "Electric Motors"... or write direct to The Louis Allis Company, 471 East Stewart Street, Milwaukee 1, Wisconsin. Ask for Bulletin 2900, "Louis Allis Adjustable Speed Drives."

*TM EATON MFG. CO.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

UNIFORM

Uniformity of
KEYSTONE WIRE
helps make jam-free staples

To produce jam-free staples calls for absolute uniformity of wire temper and diameter and unvarying staple dimensions. Holding to tolerances of plus or minus .0005″, International Staple and Machine Company, Herrin, Illinois, manufacture their Gold Crown® carton closing staples. The wire used is a special bright finish, copper-coated steel wire of cold rolling quality furnished by Keystone Steel & Wire Company. This round steel wire must have (1) correct temper throughout the coil, (2) critical tensile range and (3) a copper coating which works perfectly with International Staple's high-speed staple forming machines.

Mass production of steel staples by International Staple has been increased because of the forming characteristics of Keystone Wire which allow the wire to conform exactly to required tolerances and shaping.

In addition Keystone designed and built a platform carrier to control wire take off. This carrier means less scrap, longer runs, better protection in transit, better storage, easier wire handling and less time to set up the wire for the cold rolling operation.

Specifications for your product can be accurately analyzed and every detail closely controlled at Keystone. The wire you require can be uniformly produced through the latest and most exact methods known to the steel industry. Send us your specifications for our recommendations.

No. 16 platform carrier
600 lbs. continuous coil.

Keystone Steel & Wire Company • Peoria, Illinois, U.S.A.

KEYSTONE COLD ROLLING QUALITY WIRE STUDY

KEYSTONE
WIRE FOR INDUSTRY
MADE AT PEORIA, ILLINOIS, U.S.A.

The NEW Phillips
POZ-I-DRIV
a revolutionary new fastening development.

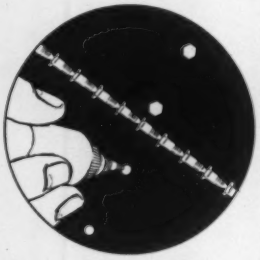
In 1933, American Screw Company gave industry the famous Phillips cross-recessed head, a fastener design that revolutionized assembly operations. And now, American presents the new POZ-I-DRIV fastener recess and driver . . . a development that offers significant reductions in assembly time and costs, increases fastening strength, improves product appearance and performance, and boosts profits.

The new POZ-I-DRIV recess is similar to the Phillips design, but provides greater driving area with reduced recess depth. This combination produces several significant advantages, including:

1. **GREATER TORQUING ABILITY** . . . making it possible to drive threaded fasteners tighter at continuous production speeds because of reduced operator fatigue.
2. **BETTER DRIVER-RECESS ENGAGEMENT** . . . practically eliminates cam-out, reduces bit wear, prolongs bit life.
3. **INCREASED DRIVING AREA** . . . with better driver stability permits shallower recess resulting in increased head strength.
4. **IMPROVED AXIAL ALIGNMENT** . . . and positive bit engagement permit 90° offset driving.
5. **COMPLETE COMPATIBILITY** . . . with present Phillips bits for field service.

AMERICAN SCREW COMPANY
Leader in Fastener Development

Since 1838, American has been making important contributions to industrial progress by the continued development of new and better threaded fasteners. Here, for example, are 3 recent developments by American Screw Company:



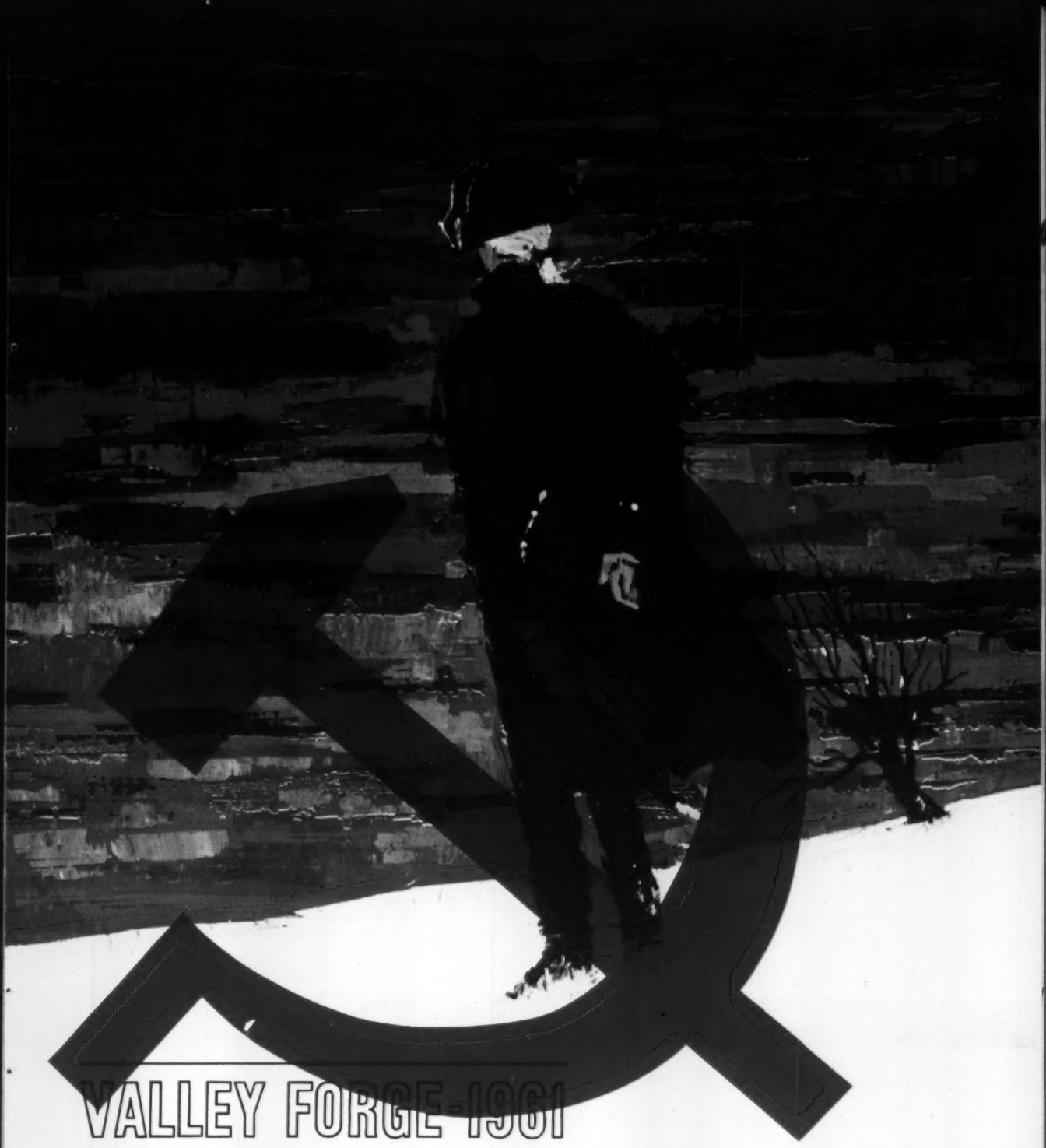
SCREWSTICK . . . consists of machine and fluted thread-cutting screws in "stick" form. Used with automatic-feeding driving tools, they can be applied as fast as the operator can position the assembly. Available in steel, brass, aluminum, nickel silver and stainless steel alloys.

TORQ-SET . . . designed for the expanding needs of supersonic aircraft, missiles and electronic components, where maximum wrenchability and reliability are of prime importance. Recess design eliminates burring that would interfere with laminar flow.

TRI-WING . . . a tamper-proof fastener, which is virtually impossible to remove without mating tool. Designed for maximum security against tampering or pilferage. With high torquing characteristics for applications requiring extreme strength or vibration resistance.

1838

AMERICAN SCREW COMPANY
WILLIMANTIC, CONNECTICUT
A Division of **NOMA LITES, INC.**



VALLEY FORGE 1961

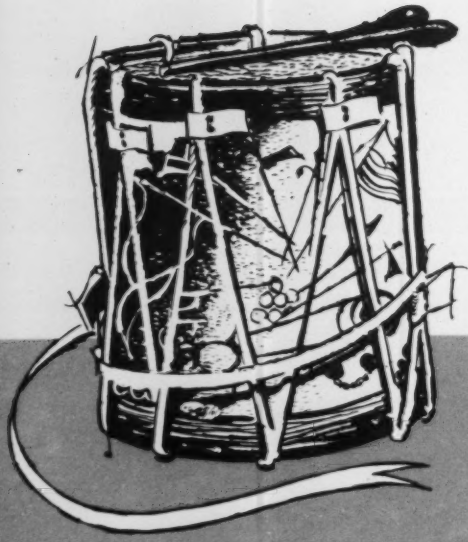
Nearly 200 years ago, at Valley Forge, we faced disaster. We face it again today, all over the globe, in our fight for industrial survival. Instead of watching competition both from here and abroad invade our established markets—and win the new ones to come . . . instead of waiting for better depreciation laws, we must fight back—now! Money invested in new machine tools—as precise and productive as only Pratt & Whitney can make them—is the first step in annihilating our enemy... obsolescence! We **didn't** surrender at Valley Forge. Will we surrender today? We **can't!** We **won't!**

Pratt & Whitney

HEADQUARTERS FOR AMERICA'S WAR AGAINST OBSOLESCENCE

machine tools / cutting tools / gages

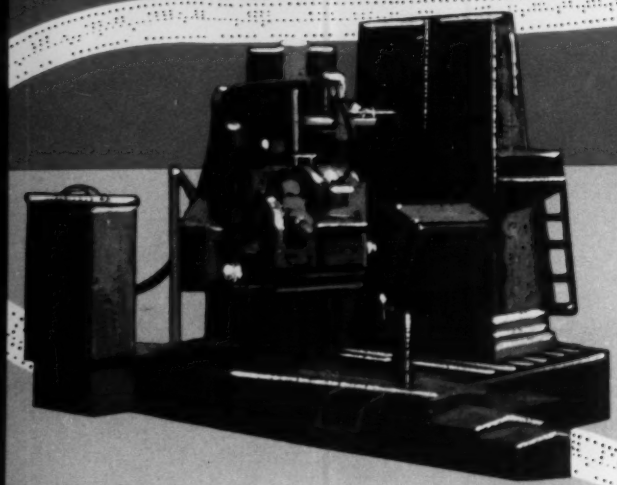
WE HAVE THE TOOLS AND TERMS YOU NEED TO WIN YOUR WAR-NOW!

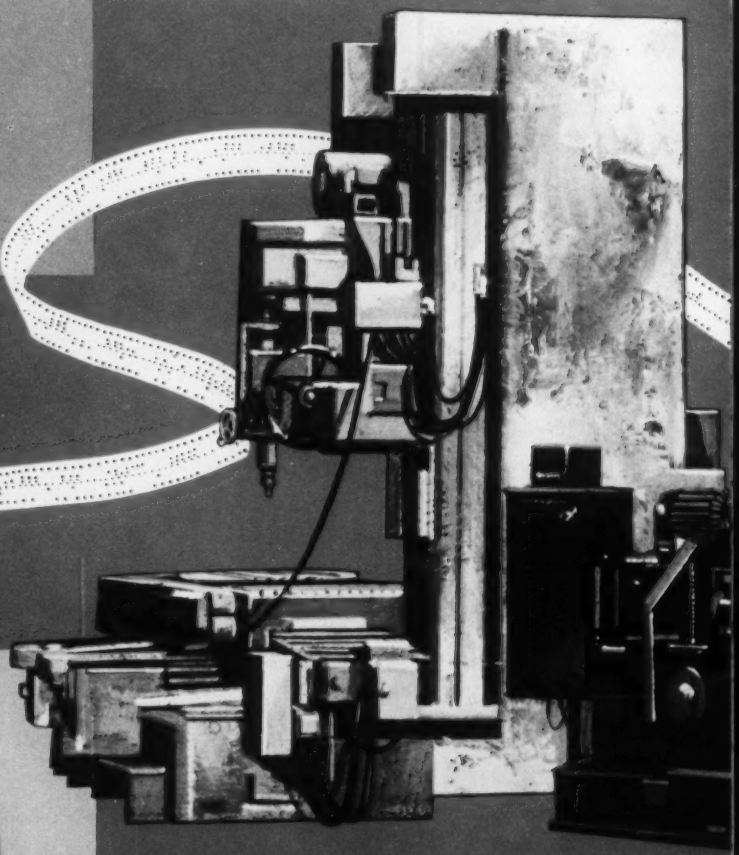


KELLER®

AUTOMATIC PROFILE MILLING MACHINES

Pratt & Whitney manufactures the world-famous Keller® Automatic Mill designed for continuous path or profile milling. Available in a wide range of models with either tracer or taped controls to speed up production and eliminate work spoilage.





Electrolimit® JIG BORERS

Industry's finest! P&W's Electrolimit® Jig Borers feature exclusives for unequalled versatility and accuracy. A complete line—from a model for precision machining of small jobs—to the biggest capacity jig borer built! Available with manual or taped controls which will insure top quality, eliminate work spoilage and increase production.

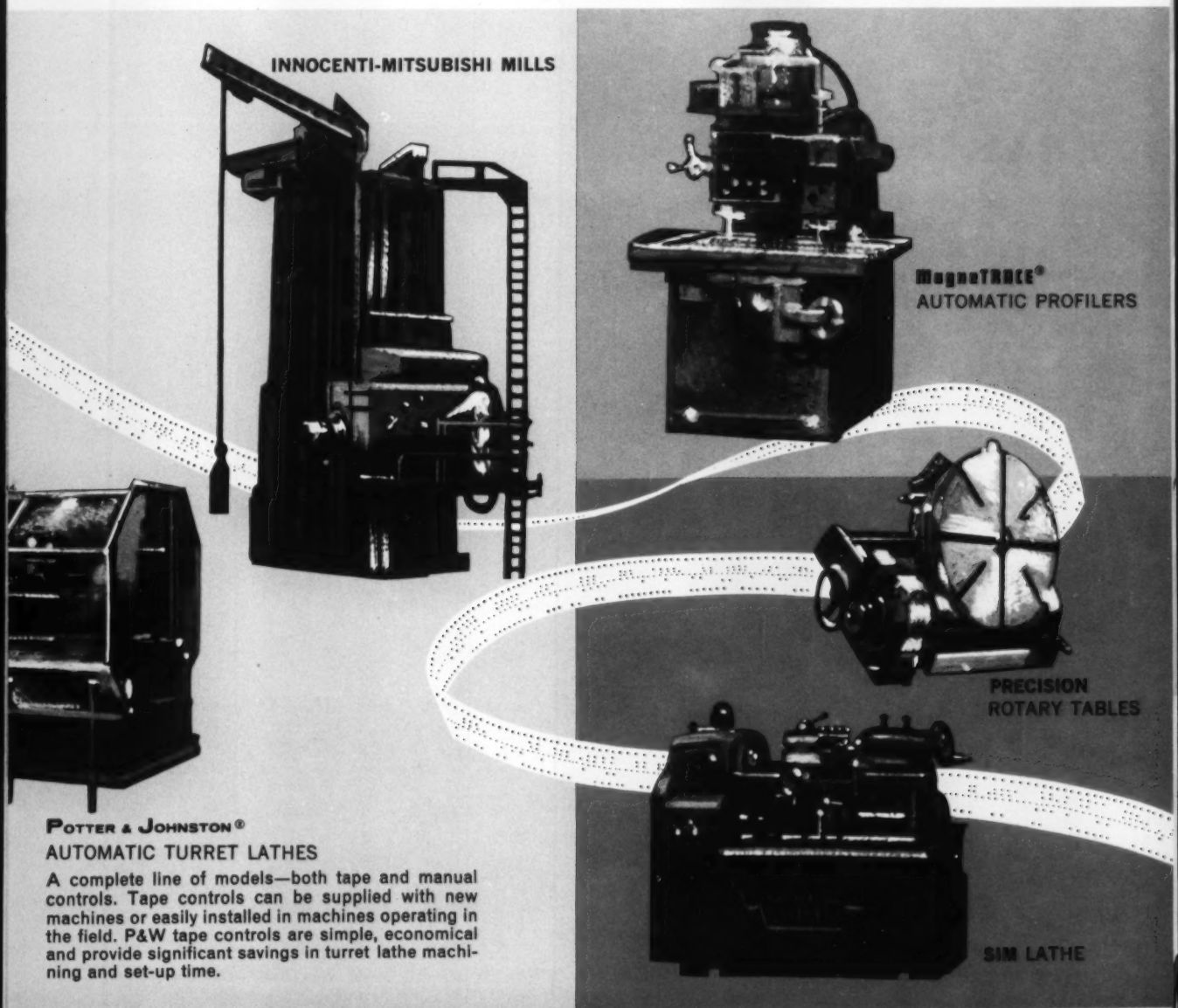
To wait is to surrender in your war against obsolescence! If your machine tools are not up to famous Pratt & Whitney caliber—obsolescence is eating up your profits—injuring your products! Pratt & Whitney Machine Tools are the best you can buy because our 100 years experience has taught us how to make them better. We believe the efficiency, quality, and precision of our Machine Tools are the answers to those with "wait-and-see" attitudes about more lenient depreciation laws!

Many of our Machine Tools are designed to bring the magic of tape-controlled automation to your production lines. All are available on terms that include lease, trade-ins, or options-to-buy. Our services are unparalleled in the industry! See for yourself: visit our Centennial Hall in West Hartford, Connecticut, where you'll find a complete up-to-date working display of Pratt & Whitney Machine Tools and a staff of experts ready to help you solve your specific metalworking problems. You're welcome to come in anytime—and prove to yourself that Pratt & Whitney Machine Tools are your best buy today—for tomorrow!

Pratt & Whitney

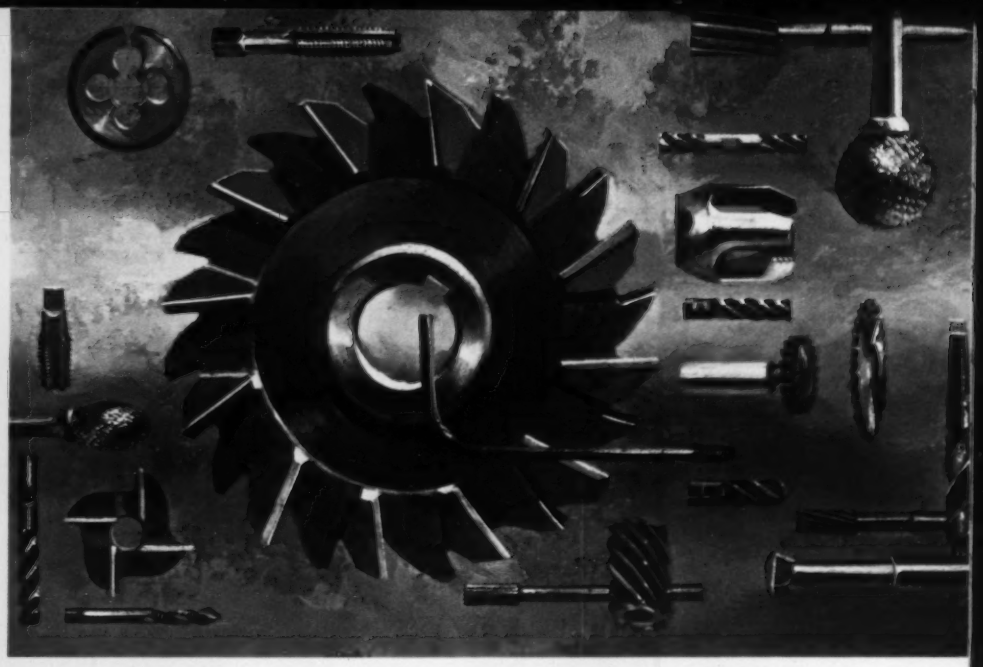
AMERICA'S HEADQUARTERS
FOR YOUR WAR AGAINST OBSOLESCENCE

JIG BORERS / ROTARY TABLES / KELLER MILLERS / MAGNETRACE PROFILERS / POTTER & JOHNSON LATHES



POTTER & JOHNSTON®
AUTOMATIC TURRET LATHES

A complete line of models—both tape and manual controls. Tape controls can be supplied with new machines or easily installed in machines operating in the field. P&W tape controls are simple, economical and provide significant savings in turret lathe machining and set-up time.



P&W's recently inaugurated policy of making P&W Cutting Tools and Conventional Gages available through factory-trained and selected Industrial Distributors makes personalized local service available to you . . . to simplify purchasing and speed delivery from local stocks.

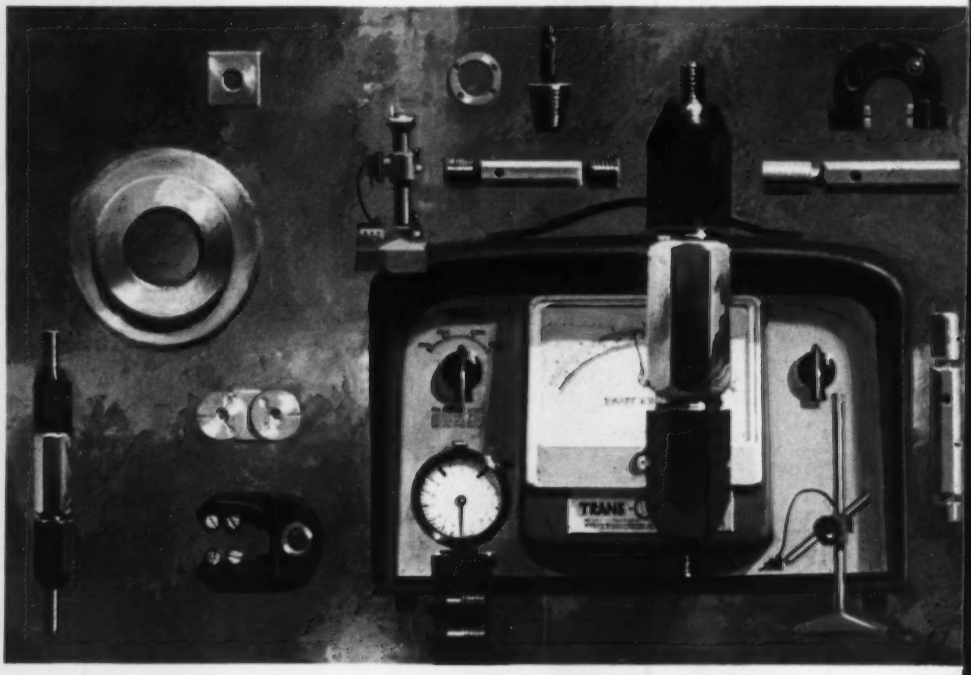
P&W Cutting Tools include: Drills . . . Taps . . . Dies . . . Milling Cutters . . . Reamers . . . Burs, End Mills . . . in HSS and solid carbides.

PRATT & WHITNEY DISTRIBUTOR

P & W CUTTING TOOLS AND GAGES

SOLD AND SERVICED BY PRATT & WHITNEY DISTRIBUTORS

P&W Conventional Gages: Plug . . . Ring . . . Cylindrical, Thread, and Snap Gages . . . Internal and External Comparators, and Precision Gage Blocks. See your P&W distributor for full information. For data on the exclusive series of AIR-O-LIMIT®, SIGMATIC,® TRANS-O-LIMIT® and DATA-LIMIT® Gages and the famous "FLYING MIKE" CONTINUOUS GAGE, see your P&W factory representative.



MACHINE TOOLS—CUTTING TOOLS—GAGES • HEADQUARTERS FOR AMERICA'S WAR AGAINST OBSOLESCENCE

PRATT & WHITNEY

A MAJOR INDUSTRIAL COMPONENT OF

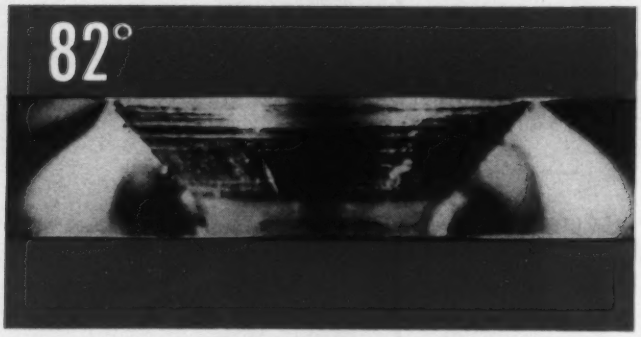
FAIRBANKS WHITNEY

PRATT & WHITNEY COMPANY, INCORPORATED, CHARTER OAK BOULEVARD, WEST HARTFORD, CONNECTICUT

A roll's life holds no secrets Men like National's metallurgist Joe Marsalka see to that. Before your roll is born, National helps select the proper composition, grade and hardness. As it is being produced, our metallurgists carefully control chill locations, pouring procedures and heat treatment. When the roll is "full-grown" ultra-sonic testing equipment checks its internal soundness making sure your roll is ready for the tough life ahead. Even after your roll is shipped, National keeps in touch with its performance in your stand. This intimate knowledge of roll life is one reason we are able to consistently produce quality steel, iron and nodular iron rolls. It's a big reason why... NATIONAL'S THE GROWING NAME IN ROLLS.

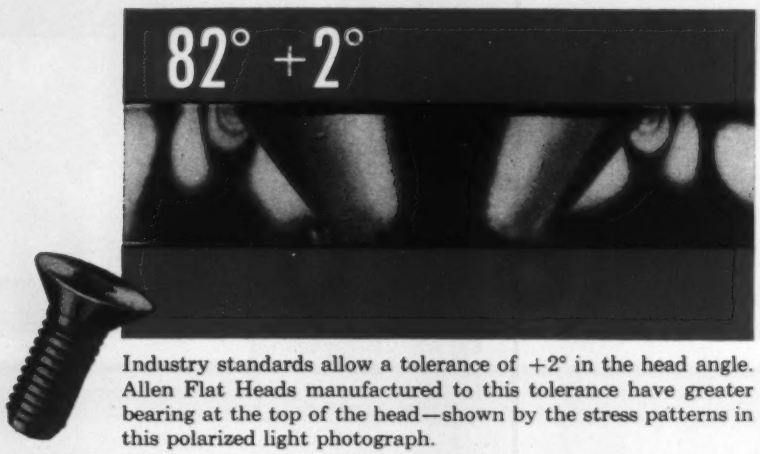
NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL INDUSTRIES, INC., Avonmore, Pennsylvania
General Steel Industries, Inc., General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.

PQA* proves it...



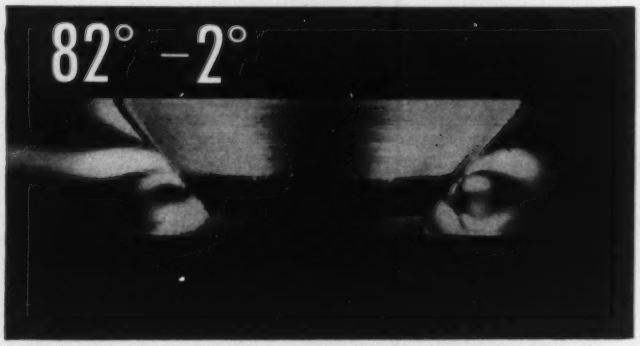
PQA makes it certain that an Allen Flat Head Cap Screw has contact throughout the angle of the head with the mating countersunk hole. This assures the strongest possible fastening. In this photo, made with polarized light, you can see the stress points throughout the chamfer.

this Allen Flat Head Cap Screw has complete all-around head contact



Industry standards allow a tolerance of +2° in the head angle. Allen Flat Heads manufactured to this tolerance have greater bearing at the top of the head—shown by the stress patterns in this polarized light photograph.

*PRODUCT QUALITY ASSURANCE



Industry also allows a tolerance of −2° in the head angle. *But Allen does not utilize this negative tolerance.* The reason—it is entirely possible to have head seating efficiency reduced because of excessive interference in the head-shank area. The photo shows high bearing stress in this area—with risk of breaking prematurely.

PRODUCT QUALITY ASSURANCE is the symbol of unquestioned quality at ALLEN. It stands for *constant* quality control every step of the way—your guarantee of quality and reliability.

ALLEN

MANUFACTURING COMPANY
HARTFORD 1, CONNECTICUT, U.S.A.

Plant at Bloomfield, Connecticut
Warehouses in Chicago, Cleveland and Los Angeles

Genuine ALLEN products are available only through your ALLEN Distributor. He maintains complete stocks close by to help cut your freight costs, inventory, warehousing and handling. He offers fast, single-source service. He knows ALLEN products. And he makes ALLEN Engineering Service available to you any time. Call him!

ALLEN HEX-SOCKET SCREWS HEAD

Open to the Public?

General Motors and the auto union will begin their contract talks June 28. Ford and Chrysler will start with the UAW on June 29 and July 1.

If past practice is repeated, they will be carried out in considerable secrecy.

We agree that it is impractical to have the parleys themselves open to everyone. But we hope the public is quickly, accurately, and completely informed of all developments as each session ends. The public has not been so fortunate in previous auto, steel, and other important contract negotiations.

Negotiators have defended their silence on the ground that disclosure "would impede the course of bargaining." But many observers believe that lack of open communications by both sides may ruin negotiations—as in the steel sessions of 1959.

Steel company representatives had been concentrating largely on issues of inflation and foreign competition, but in the early summer of that year, they broadened their attack to work rules. They did not quickly or fully explain to the public that they were trying to generate a climate in which greater efficiency would be possible.

President David J. McDonald wasted no time in giving USW members and the public his version of management's aims—bust the union and take from workers what they had won in years of bargaining and strikes. By the time industry tried to correct the union's interpretation, the harm was done. The misapprehension helped cause the strike, with damage to the steel companies, their employees, and the economy.

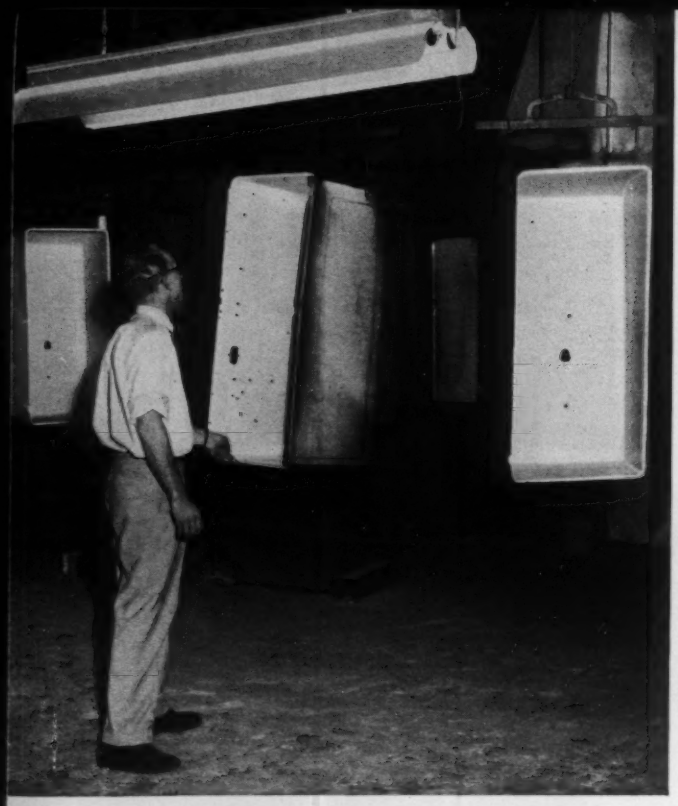
The talks this summer will have impact far beyond the auto industry. They will closely affect all nonautomotive UAW contract sessions, and they will influence other labor-management parleys—for example, in steel during 1962.

The public has a big stake in the auto negotiations. Too often in the past, it has been misled about the issues in a labor-management dispute—via "information" distorted by secondhand sources or the bias of one side's viewpoint.

Auto and UAW negotiators will do a public service by quickly, accurately, and completely revealing session-to-session developments.

John S. Morgan

ASSOCIATE MANAGING EDITOR



Direct-on enameled food liners pass the watchful eye of an inspector as they leave oven. Direct-coated Bethnamel food liners, which comprise some 75 pct of plant's output, have eliminated corner brushing. They are free from fishscaling, boiling, and gassing defects.

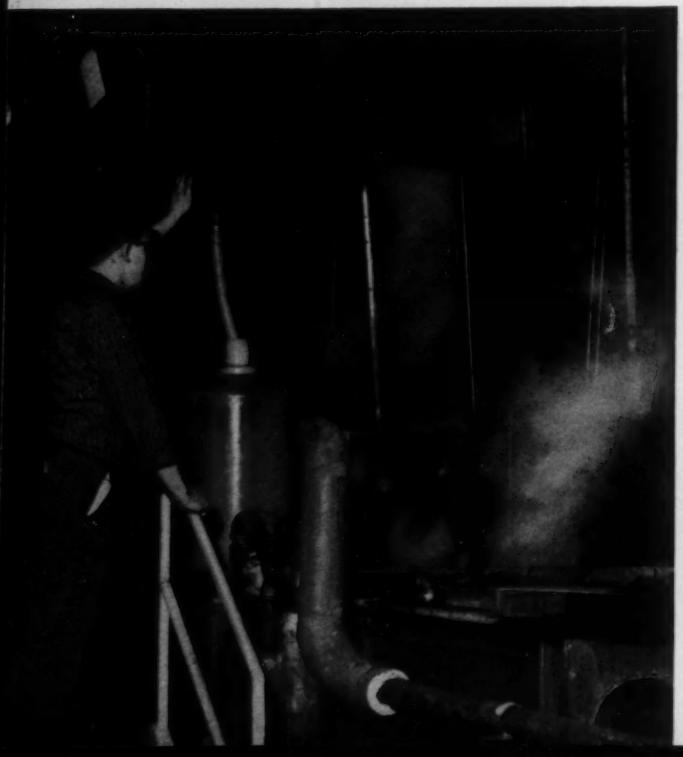
Finished refrigerator shows direct-coated liner and crisper pan in place. Westinghouse also considers Bethnamel a top-quality sheet even for parts that have to be two-coated. And there's no cost penalty—the price is the same as for conventional enameling iron.

Steel

for Strength
. . . Economy
. . . Versatility

Here you see sulphuric acid being added to ferric sulphate pickle solution, to maintain an operating pH limit of 1.3 (±.1). The metal removal is controlled at about 2 gr per sq ft. Bethnamel performs well in this bath.

After the acid bath and rinse, the liners enter a nickel flash in de-ionized water. Westinghouse aims at a nickel deposit of .1 gr per sq ft minimum. Here the pH runs about 3.0 to 3.1.



How Westinghouse uses Bethnamel in direct-on porcelain-enamel process

Here's how Bethnamel... ***Cuts work-processing time · Lowers enameling costs · Improves finished product***

Westinghouse was one of the first to do extensive plant work in the development of the direct-on finish process for production runs of porcelain enameled products. They were quick to take advantage of the almost-zero carbon content of Bethnamel, the new porcelain enameling sheet developed by Bethlehem.

They Use Ferric Sulphate-Sulphuric Acid Pickle

At their Columbus, Ohio, plant, Westinghouse is now using Bethnamel in production of refrigerator food compartments and crisper pans. They prepare the Bethnamel steel surface for excellent adherence and appearance by a metal preparation system developed in the laboratories of a frit maker. This involves a ferric sulphate-sulphuric acid pickling process.

Enamel used at Columbus plant was chosen on basis of resistance to crazing at food-liner corners. After the spray operation, it is fired at 1525 deg F in a 64-ft hot zone at line speed of 22 feet per minute.

Enameling Time Cut by 25 per cent

Results have equalled or bettered those obtained in the conventional ground-and-cover-coat system. Bethnamel's negligible carbon content eliminated boiling and fishscaling problems. Work processing time has been reduced about 25 pct during the enameling operation, and enameling costs were significantly lowered through elimination of the ground coat. Westinghouse has found that Bethnamel welds much more uniformly than enameling iron.

May we send you Folder 734?

Bethnamel's superior performance in the porcelain enameling of a wide variety of products has established this remarkable sheet as the new standard of the industry. You can enjoy Bethnamel's advantages at a cost no higher than that of ordinary enameling iron. Let us send you Folder 734. Ask our nearest sales office or write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

HOW TO TAKE THE EDGE OFF A HEADACHE

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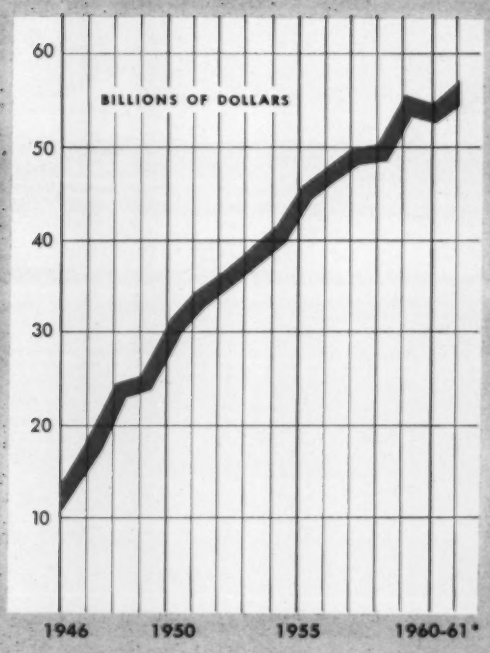


Source: U. S. Department of Commerce 1946-60.

*Estimated.

Metals Vie for Builder's Dollar

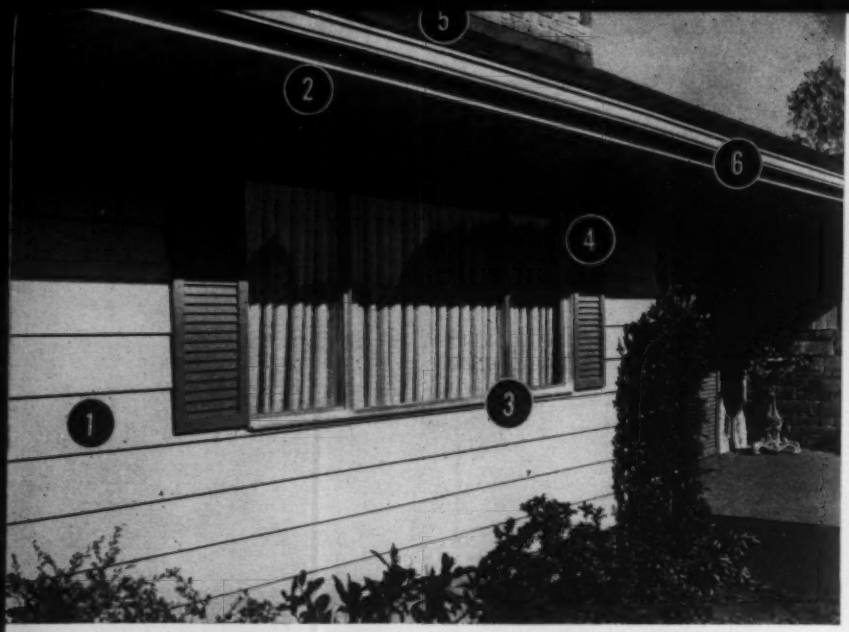
ONE OF the hottest market fights of all time is shaping up in the construction industry arena. The contestants: Producers of materials.

Listen to Mark Cresap, president, Westinghouse Electric Corp., Pittsburgh: "The value of all the buildings standing in the U. S. is approximately $500 billion, but it is estimated that $600 billion will be spent in the next ten years on new construction of all types."

The big purse is intensifying the already stiff competition. Steel producers are defending their position in multistory structure framing against makers of precast concrete; they are wrestling with aluminum producers over the curtain wall market; and they are challenging all comers in certain areas of residential construction. The aluminum people are steadily growing in the residential field and are fending off attacks on their curtain wall territory. Those materials, plus copper, zinc, ceramics, plastics, and lumber, are in competition in such areas as decking, prefabricated wall panels, hardware, and roofing.

• **Pressures** — People who build homes, apartments, schools, shopping centers, and factories are concerned with economy, aesthetics, structural soundness, and speed of fabrication—in short, the best structure for the least money. So they generally don't show allegiance to any one material.

During the last ten years, the cost of construction labor has increased by more than 50 per cent, while the cost of materials has advanced only half as much. Result: Builders are looking for ways to save manhours on the job site. The situation helps to explain why sales



Source: Kaiser Aluminum & Chemical Corp.

Six uses of aluminum in this conventional home:

1. Siding
2. Soffits
3. Window units
4. Shutters
5. Chimney flashing
6. Gutters

of manufactured homes have risen steadily over the last decade—they accounted for 13.1 per cent of single housing starts in 1960.

A spokesman for Harvey Aluminum Inc., Torrance, Calif., adds: "The construction industry is on the verge of breaking through the production barrier. The threshold of assembly line construction is growing nearer."

Maintenance costs have risen too. Buyers are putting pressure on builders to use materials that require less upkeep despite higher initial cost.

Metals Face Hurdles

• **Public Sets Pace**—Producers know that people aren't ready to buy all-steel or all-aluminum homes—although metals are accepted in commercial and industrial buildings.

"We are willing to accept the public's taste," says Samuel J. Simmons Jr., general manager, Sales Development Div. and Industry Sales, Aluminum Co. of America, Pittsburgh. But metal producers are going all out to change public tastes; they are also shooting for more immediate results by introducing some less conspicuous applications such as aluminum soffits and steel joist supports.

• **Educate the Architect** — Metalworkers are beginning to realize they can't rely on old products or new ones to insure them a share of the growing market. They must take an extra step: Educate the architect. The architect, for example, who doesn't have enough information on high strength steels cannot properly design with them. He may make an improper cost comparison, or he may think in terms of older structurals and decide to use concrete.

• **Building Codes**—The construction of commercial, industrial, and apartment buildings could be a boon to producers of metals, particularly with the growing emphasis on urban renewal and the trend toward apartment living. However, building codes sometimes favor obsolete building materials and construction methods. Codes have forced steel and aluminum producers to fight for revision. But they are frequently opposed by unions—bricklayers, masons, and others. The National Association of Home Builders, Washington, estimates that 25,000 city, county, and state codes need updating.

What's at Stake?

In 1960, steelmakers shipped 9.7 million tons of finished steel to the construction industry (13.6 per cent of output). Approximately 611,000 tons of aluminum (about 30 per cent of output) went to construction. The figures do not include the amounts sold by warehouses and contractors' products. A lot of zinc and copper are also used in construction.

It is estimated that the average U. S. home requires 2 tons of steel and 100 to 200 lb of aluminum. Producers see opportunities to boost applications at the expense of wood, plaster, and brick.

John P. Jansson, market development manager, Metals Div., Olin, New York, estimates that nearly 15 per cent of all nonresidential exteriors erected last year were clad with metal framed curtain walls. The market is expected to reach 19 per cent this year, 25 per cent by 1963—but not without a fight with the proponents of concrete.

The Outlook

• **Industrial, Commercial**—In construction of industrial and commercial buildings, the competition among metals is hottest in curtain wall paneling. The aluminum industry has the lead, offering a favorable price and a variety of colors and textures. Steel producers like Washington Steel Corp., Washington, Pa., are turning to painted stainless to

Source: Aluminum Co. of America.

Aluminum siding is expected to be used in 1 out of 12 housing starts this year

Source: Metal Lath Manufacturers Association.

A helpful ally — machine-applied plaster boosts use of steel lath and studs

Source: American Zinc Institute.

Electrogalvanized sheet is often employed as a backup panel in curtain wall construction

Source: U. S. Steel Corp.

Steelfast speeds dry wall installation

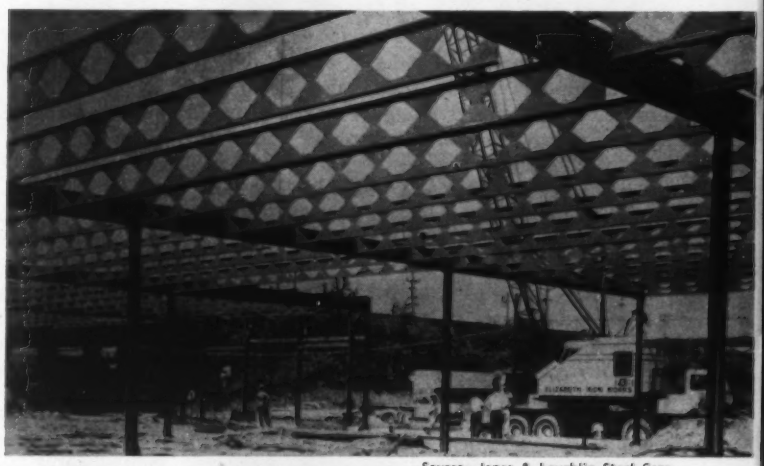
Source: Bethlehem Steel Co.

Gaining in builder acceptance—Here a 2 ton residential frame is erected in less than two days

even the match. Porcelain enamel finishes, now used on both steel and aluminum, are said to be helping the steel people make some gains. The Copper & Brass Research Association, New York, points out that the development of improved finishes could put the copper metals in a better position.

Aluminum elevated flooring, a specialty area, has good potential. Alcoa officials state that most elevated decking in computer installations is made of aluminum. Challenging the steel industry, aluminum producers offer a self-contained wall panel with enclosed insulation and integrated provisions for utilities. They plan to compete too in prefabricated load bearing walls by using integrated aluminum structural members. They are working on the cost factor and extruding new structural shapes.

A lot of attention has been given



Source: Jones & Laughlin Steel Corp.

Making the cost of steel more competitive—a beam is bisected lengthwise in a serrated line. The two sections are welded at the ends of the serrations, forming a deep, strong structural. Ducts, pipes, and conduits can pass through the web openings

"We asked ourselves: 'What part of a house can be built better with steel?' "

Robert C. Myers
Director, Market Development Div.,
U. S. Steel Corp.

"The public's taste is a fact of life—it only indicates the educational job we face in getting people to accept aluminum in their homes."

Samuel J. Simmons Jr.
General Manager, Sales Development Div. & Industry Sales
Aluminum Co. of America

to the battle between steel and concrete in the structural field. After losing some ground, steel companies are retaliating with several methods of making the cost of their product more competitive. High strength steels ranging up to 100,000 psi can carry a bigger load for less money than former structurals. Concepts of prestressing and plastic design are also being refined and promoted as ways of doing more work with less steel. Designers are frequently running ductwork through the webs of beams, saving space above and below floors and reducing the height and cost of buildings.

• **Residential**—Robert C. Myers, director, Market Development Div., U. S. Steel, says his company found the best approach to this market was to learn: "What part of a house can be built better with steel?" Pointing out that the builder has the most to say about what goes into a house, he states that new steel applications must provide the builder materials to do a job faster, better, and more economically than other materials.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., uses a three stage marketing program: "Determining builder needs, obtaining initial builder acceptance of tailored aluminum products, and expanding public demand throughout the nation."

Steel framing in houses, if widely accepted, could raise the average steel use per house (2 tons) by 8 to 12 tons. Bethlehem Steel Co., Bethlehem, Pa., recently did a survey on the West Coast to explore the market. Builders there reported they could build better houses with steel framing, particularly on hillside lots, and the speed of erection would save costly manhours.

People liked the model home clad with porcelain enamel steel which Ferro Corp., Cleveland, displayed last year. The public seems to be ready for it.

Steel producers are teaming up with fabricators and builders on much of their research. They're seeking to create new markets by solving age-old construction problems. Recent developments include troublefree doors, thresholds that withstand years of traffic, new concepts of fastening wood framing, and steel channels which speed the installation of dry walls.

Still in the research stage is steel siding which may have a paint, vinyl, or porcelain enamel finish.

The aluminum people are in the thick of the new housing fight. Aluminum clapboard, backed with plastic foam insulation, can be applied directly to studding to save work and materials.

Jerome J. Kaufman, president, Alside Inc., Akron, says: "Aluminum siding wasn't in more than 20,000 starts in 1960. We expect 100,000 aluminum starts in 1961, and we are shooting for 200,000 starts with baked enamel siding within five years."

In the manufactured home business, National Homes Corp., Lafayette, Ind., reports that 1500 to 2000 lb of aluminum sheathing go into about 80 per cent of the more than 20,000 homes it turns out annually.

Mr. Simmons of Alcoa says that window units have comprised the major use of aluminum in home building in the past, but "siding has developed into a big market." He believes aluminum roofing, still a newcomer, might become an even larger market than siding.

A new market for aluminum is taking shape. Albert M. Cole, executive vice president, Reynolds Aluminum Service Corp. (subsidiary of Reynolds Metals Co., Richmond, Va.) says there are at least 12 million substandard homes in urban neighborhoods that need rehabilitation. Look for the industry to go all out in the competition.

Economists expect 1961 housing starts to remain near the 1.25 million mark, but a surge sometime during the sixties seems inevitable.

E. J. Hanley, president, Allegheny Ludlum Steel Corp., Pittsburgh, says: "It will take 23 million homes to provide the additional space needed by 240 million Americans by 1975. More houses will have to be built in the next 15 years than were built during the last 30."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

How Spending Would Be Boosted If We Got Effective Depreciation Reform

Here's a breakdown, by plant size and industry groups, showing how much metalworking would increase its capital investment if effective depreciation reforms were enacted. Total spending would rise 5.7 per cent.

	Percentage That Would Increase Their Spending	Amount Total Spending Would Be Increased
BY PLANT SIZE		
Employing Less Than 100	55%	6.2%
Employing 100 to 499	50%	5.1%
Employing 500 or More	44%	4.3%
BY INDUSTRY GROUPS		
S.I.C. 33—Primary Metals	48%	4.7%
S.I.C. 34—Fabricated Metal Products	55%	6.4%
S.I.C. 35—Machinery, Except Electrical	57%	6.1%
S.I.C. 36—Electrical Machinery	43%	5.2%
S.I.C 37—Transportation Equipment	47%	4.8%
S.I.C. 38—Instruments, Related Items	48%	4.7%
Other Metalworking Industries*	53%	4.7%

*S.I.C. 19 (Ordnance), 25 (metal furniture), and 39 (miscellaneous manufacturing).

Here's proof . . .

Effective Depreciation Reform Would Give Economy a Big Lift

STEEL surveyed 1175 general managers of metalworking plants. We asked them this question: "If the federal government provides for effective liberalization of depreciation laws, will you increase your spending for plant and equipment in the coming two years?"

"Yes, we would," answered 52 per cent of the managers; 40 per cent said "no"; the remaining 8 per cent weren't sure.

To those who said they would increase their spending, STEEL posed the question "How much?"

The answer: A booming 12 per cent!

That amounts to a 5.7 per cent increase in the total dollar volume of metalworking's equipment purchases. And that figure does not include any increases that could come from firms that now say they wouldn't hike their spending.

That means metalworking would spend, over the next two years, about $550 million more for capital equipment than the industry presently plans to shell out.

It would lower unit manufacturing costs, thus helping U. S. manufacturers to better compete in world markets. It could help to shore up the industry's poor profit margins.

It would help substantially to stem the tide of inflation.

• **What's Needed**—Most manufacturers do not consider the Treasury Department's tax incentive plan to be "effective liberalization of the depreciation laws." They would much prefer—and they won't boost their investments unless they get—depreciation reform more along the lines of the Smathers-Keogh Bills, or some similar type of basic change in our present antiquated depreciation laws.

The STEEL survey seems to prove that Congress could give the economy a shot in the arm, alleviate our unemployment problem, boost exports, and stem inflation by enacting basic depreciation changes now.

'61 Capital Spending to Slip 3% Under '60 Level

BUSINESS SPENDING for new plant and equipment will fall 3 per cent below the 1960 level during 1961. Although seasonally adjusted outlays will be up in the third quarter, actual spending will be down slightly from the second quarter's, report the Securities & Exchange Commission and Department of Commerce. The SEC's April-May survey of spending plans reveals 1961 expenditures will total $34.46 billion vs. $35.68 billion in 1960.

While expectations for 1961 are slightly below the January-February prediction of $34.57 billion, shifts by industries generally offset each other. Improvement over earlier figures were shown by mining, railroad, and commercial companies. The mining industry is planning a 4 per cent increase in outlays as opposed to a previously indicated decrease. Railroads plan a one-third decline in spending vs. an earlier estimate of a 40-per-cent-plus drop. Commercial companies have also reduced the expected decline for 1961.

Nonrail transportation firms now say they'll drop expenditures by 9 per cent instead of 5 per cent, reflecting lower spending anticipations by pipeline and airplane companies. Public utilities revised their proposed outlays from a 10 per cent to a 4 per cent boost over 1960's.

Plans for the year by durable goods manufacturers have weakened somewhat and are now scheduled at 10 per cent below 1960 compared with a 7 per cent reduction in the earlier report. All industry groups except iron and steel and miscellaneous durable goods indicate lower outlays than previously expected. Nondurable goods makers showed a small increase in anticipations.

First quarter expenditures were at an annual rate of $33.8 billion (seasonally adjusted) the same as the second quarter. The third quarter rate is pegged at $34.60 billion and the fourth quarter pace, calculated by the residual method, is seen at $35.54 billion.

Actual spending in the first quarter ($7.57 billion) was below projections. The second quarter figure rose to $8.72 billion. The third quarter total is expected to slip to $8.70 billion. The high for the year ($9.47 billion) is expected in the fourth quarter.

How '61 Will Compare with '60

(Billions of dollars)

	Actual 1960	Anticipated 1961	Percentage Change
Manufacturing	14.48	14.00	− 3
Durable Goods	7.18	6.45	−10
Nondurable Goods	7.30	7.55	+ 3
Mining	0.99	1.03	+ 4
Railroads	1.03	0.70	−32
Transportation, Except Rail	1.94	1.76	− 9
Public Utilities	5.68	5.91	+ 4
Commercial & Other	11.57	11.05	− 4
Total	35.68	34.46	− 3

Source: Commerce Department.

Buy to Hold Down Costs, PAs Told

COUNT on the profit squeeze to be increasingly severe, even though business is improving.

That warning was expressed repeatedly at the 46th annual international convention of the National Association of Purchasing Agents in Chicago.

The reason: Intensified competition stemming from increases in industrial capacity both here and abroad.

One result: Purchasing agents will find themselves compelled to do a topnotch job of buying to help hold down costs. A purchasing agent cannot afford to remain complacent, declared NAPA's outgoing president, Paisley Boney, PA for a textile firm, J. P. Stevens & Co. Inc., Greensboro, N. C. Purchasing, he lamented, is too often headed by a mediocre member of middle management when its head should be one of the best qualified members of the top management team.

• **Heated Competition** — The increase in competition was in evidence at the NAPA Metals Forum. Speakers served notice they'll be aggressively calling on the purchasing agents for business.

This statement by Jean Vuillequez, vice president of sales, American Metal Climax Inc., New York, was typical: "In this decade, you will hear a lot about lead and zinc taking business away from other materials. We're going after markets."

• **Price Ceiling?** — Similarly, Dr. Joseph Zimmerman, vice president, Miles Metal Corp., New York, reported that copper producers have organized a group to find new uses to offset markets lost to other materials. One thing they'll keep their eyes on is price. "It's the consensus," Dr. Zimmerman said, "that

when copper goes above 33 cents a pound, other materials can move in. The copper industry won't permit itself to be priced out of the market."

Aluminum users were assured by Irving Lipkowitz, New York, director of economic affairs, Reynolds Metals Co., that "there's no fear of supply bottlenecks in aluminum. There's plenty of capacity—some of which is idle." Recognizing the battle for markets by all materials, Mr. Lipkowitz said: "Aluminum, if it's to be successful, will have to make itself more useful to more people."

• **Look Abroad**—More U. S. industries and companies should look abroad for markets, said Charles H. Percy, president, Bell & Howell Co., Chicago. He feels it is to this country's interest to do so.

The steel industry is also market minded, said Marcus J. Aurelius, administrative vice president, U. S. Steel Corp., Pittsburgh. He predicted:

Steels with yield strengths of 125,000 to 250,000 psi will be common. Two or more kinds of steel will be combined and processed into sheets, plates, and structurals to utilize the best properties of the components in the most economical form. Better and more varied coatings of steel sheets with plastics, paints, enamels, and metallics to banish corrosion problems are being developed.

• **Tips for PAs**—Mr. Aurelius gave a few tips on how purchasing agents could help themselves in buying steel. They are:

1. Hold changes in mill orders to minimum, and give the mill those changes as rapidly as possible.

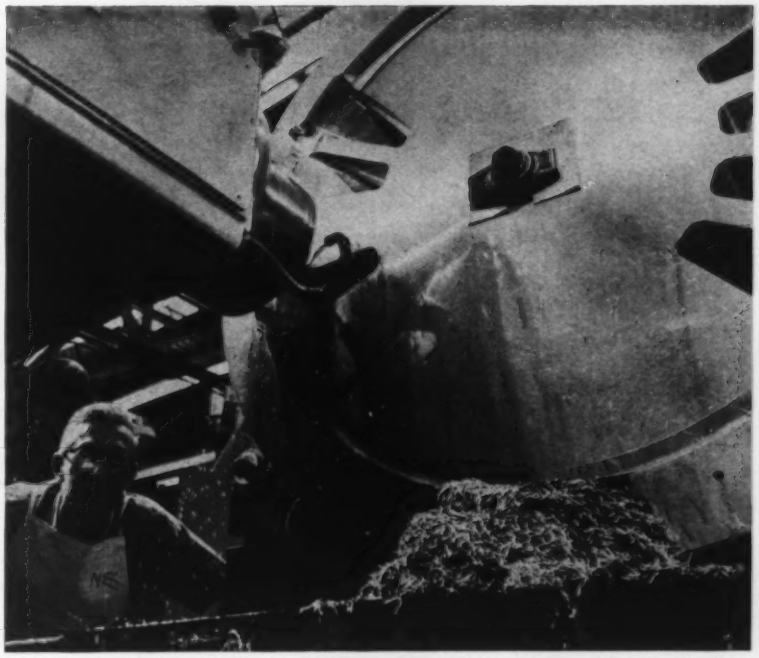
2. Allow flexibility in transportation arrangements.

3. Be specific as to the time shipment is wanted.

4. Tell the mill what you expect to use the steel for.

5. Have the steel salesman talk with the key people concerned with design, fabrication, and sale of your products.

The purchasing agents will hold their annual convention in Chicago again next year—May 6 to 9. Russel T. Stark Sr., director of purchases, Burroughs Corp., Detroit, was elected president of the association for the coming year.



Bowl = Sphere, Inside/Center (0,0,0) Radius (1.75)

THE HEADLINE above contains all the information needed to instruct a numerically controlled machine tool to machine a three dimensional, bowl shaped contour into a part.

The Autopromt program, announced last week, lets the user describe (in a 250 English word vocabulary) the surfaces of three dimensional shapes. So he doesn't have to define each path the cutting tool must follow. Each path is automatically generated by a computer on the basis of the simple description. Developer: IBM's Data Processing Div., White Plains, N. Y.

• **Program Sequence** — Working from an engineering drawing of the part and with knowledge of the tool that will do the machining, the programer writes a series of statements (like that above), describing each surface to be machined, the relationships of surfaces to each other, and the machining requirements such as tolerance and tool size. The information is punched into cards and fed into a computer.

Also, a processor program is stored in the computer. This series of more than 30,000 instructions enables the computer to automatically generate the tool paths necessary to operate the machine tool. Under control of the processor, the computer translates the language code into suitable computer codes, simulates the surfaces and boundaries to be machined, and then calculates the detailed tool travel instructions for each machining region.

United Aircraft Corp., East Hartford, Conn., which co-operated with IBM in the development of Autopromt, is the first company to put the new program to use. Using a Pratt & Whitney Co. Inc., Numeric-Keller, United reduced the leadtime on a gearbox cover (shown above) from three months to about four weeks (one for writing the program, three for running the program on the computer and correcting input errors).

Hassle over Patents Looms . . . Rights to Inventions Developed Under U. S. Contracts Might Be Up for Grabs

DAVID L. LADD
U. S. Patent Commissioner

ADD ANOTHER alphabetical agency to the list of commissions, committees, boards, and administrative agencies that harass metalworking—if Congress goes along with Sen. Russell B. Long's (D., La.) proposed Federal Inventions Administration (FIA). (See STEEL, May 22, p. 83, for an indication of the extent of government pressure on industry through the regulatory agencies.)

Senator Long's invention, the FIA, is contained in S. 1176, which also calls for the acquisition by the government of all patent rights to inventions resulting from government financed research and development. S. 1084, introduced by Sen. John L. McClellan (D., Ark.), is a similar measure. The Patents, Trademarks & Copyrights Subcommittee of the Senate Judiciary Committee has held two sets of hearings on the measures this year. The measures have not been reported out of the subcommittee.

So far, there is no sign of action by the House Patents Subcommittee. A spokesman suggests there is little reason to expect any move in the House this year because measures similar to those in the Senate would have to be introduced; hearings would have to be held; and the full House Judiciary Committee would have to approve.

Nevertheless, industry should not ignore the patent proposal even if the Senate Judiciary Committee forestalls action this year. Legislators like Senator Long lose sight of the fact that when a contract is awarded to industry by the Defense Department or the National Aeronautics & Space Administration, the award is in terms of the company's accumulated knowhow.

It is illogical to reason that any invention under the contract should belong to the government.

● **WILL PENTAGON ACT?** — Patent lawyers in Washington expect a statement of the Kennedy administration's position on patent policy and government contracts soon. Perhaps it will come from the Pentagon, perhaps from the Commerce Department. Informed sources say Commerce Secretary Luther Hodges has issued orders that the Patent Office, headed by David L. Ladd (see photo), help find some "middle ground" between the extreme positions of Senator Long and those who would not give the government any right to inventions involved in government contracts.

Assistant Secretary of Commerce Hickman Price will be chairing a meeting in Washington, June 27-28, which will bring industry and government together. It may become a forum for industry, or the Defense Department may propose a position like this: Nonexclusive, free licenses would go to the government for inventions developed under a government contract. Otherwise, the invention is the company's.

Commissioner Ladd, questioned by STEEL on his position, commented that the bills before the Senate subcommittee represent the most important legislation on patents in years. His office is expected to see eye to eye with the Defense Department's view.

The Commerce Department's position could hardly be otherwise, especially with Assistant Secretary Price advocating massive doses of research for the development of new industries in this country to help counteract technological unemployment. A vast, new research program, aided by government matching funds or some other means, would hardly get to first 'base if the government took rights to all inventions.

● **CRISIS FOR PATENT OFFICE**—Commissioner Ladd warns that not only is there legislation in the wind to change our patent system, the Patent Office itself is troubled by the complex methods used to examine patent applications. In the last year, the office was not able to reduce the backlog of pending cases (almost 200,000). Output of the examining operation has declined steadily, about 2 per cent a year. Moreover, the Patent Office has a harder time keeping trained examiners. Every month, 16 patent examiners leave their jobs, usually for positions with private industry.

One trouble, of course, is money. The commissioner asks industry to endorse new fees recommended by the Eisenhower administration because "the needs of the Patent Office in the years ahead will be great."

The Patent Office is approaching the issuance of its 3 millionth patent, and its workload is up to about 80,000 applications a year—ultimately, 65 per cent become patents. On the average, it takes 36 to 42 months to get final action on a patent. The office hoped to help solve the workload problem with more mechanical search techniques, but it has run into technical difficulties.

One way Commissioner Ladd plans to increase service to industry: Establish regional search centers (with microfilm records of the complete patent file) in places like Los Angeles, Chicago, and Cleveland.

EF

Wire Mesh Belt Furnaces

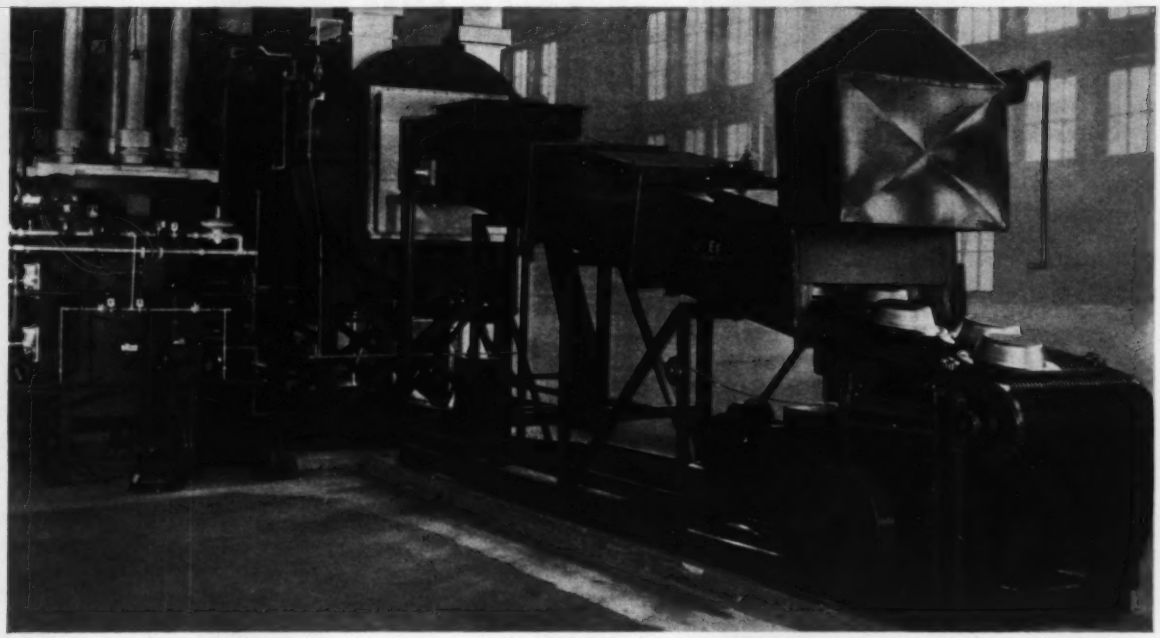
for bright annealing stainless steel and alloy stampings; also sintering, brazing and other heat treating operations.

The EF fuel fired, muffle tube, hump type wire mesh belt furnace pictured below bright anneals 500 pounds of large nickel-chrome alloy stampings per hour at 2150°F in a dissociated ammonia atmosphere. The heat resisting alloy muffle tube protects the materials from contamination by the products of combustion, and the inclined or hump design helps to contain the special atmosphere.

Horizontal straight-through, muffle tube, wire mesh belt furnaces are widely used for sintering ferrous and non-ferrous metal powder products, copper brazing, brass brazing, silver soldering, fluxless copper brazing of stainless alloys, and similar operations.

EF radiant tube fuel fired or electrically heated furnaces, of either hump or straight-through design, can often be used in these services without requiring a muffle.

Call the EF engineers on *every* heat treating problem. Our long experience and extensive research and development facilities can save you both time and money.



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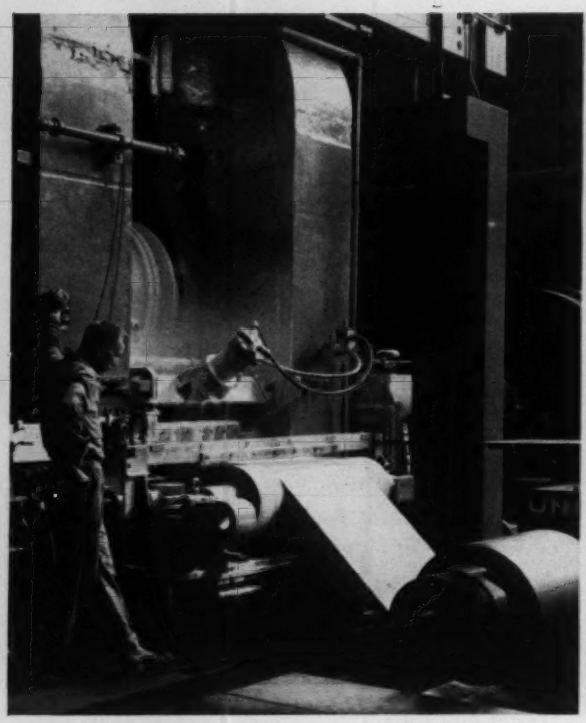

METALWORKING — Kentucky's No.1 Industrial Activity

KENTUCKY offers the metalworking industry many unusual advantages. That's why fabricated metal and machinery make up Kentucky's biggest industry . . . why employment in this industry has increased 64% in the past ten years. In fact, Kentucky's 42,000 metalworking jobs account for more than one-fourth of all manufacturing employment in the State. And in 1958, value added to products by 295 Kentucky metals and machinery manufacturers totaled more than $490,000,000.

Metalworking companies are discovering that Kentucky offers maximum opportunity for progress and profits:

Kentucky is at the center of your markets with 68.4% of the nation's population within 500 miles, 50.7% within 400 miles, 38.1% within 300 miles. Thus, metal products manufactured in Kentucky can be delivered to your customers faster and at lower costs. Kentucky has a tremendous pool of responsible, easily-trained people eager to work. Great resources of natural and man-made raw materials are readily available . . . coal, water, oil, natural gas, electric power.

Combine these important factors with Kentucky's favorable business climate, its record number of financial plans for new and expanding industries . . . and you can readily understand Kentucky's impressive growth in the metals and machinery industry.

Let us give you more reasons why Kentucky industry is growing 55% faster than the national average. Tell us your needs, and we will send you a complete, professional analysis of Kentucky's ability to fulfill them. Your inquiry will be held in strictest confidence. Address:

Lieutenant Governor Wilson W. Wyatt, or
E. B. Kennedy, *Commissioner,*
Kentucky Department of Economic Development
800 Capitol Building, Frankfort, Kentucky

COMMONWEALTH OF
KENTUCKY
WHERE BIG THINGS ARE HAPPENING

"Take two managers and give to each the same number of labourers, and let these labourers be equal in all respects. Let both of these managers rise equally early, go equally late to rest, be equally active, sober, and industrious, and yet one of them, without pushing the hands that are under him more than the other, shall have performed infinitely more work. To what is this owing? Why simply to contrivance resulting from that forethought and arrangement which will guard against the misapplication of labour."

—From "Instructions to John Fairfax" by George Washington (Jan. 1, 1789)

Manage for Profit Growth

"THE TROUBLE with my middle managers, and most of my top executives, is that they think in terms of volume rather than profits," the president of a sizable metalworking company told STEEL.

How do you correct that? How do you get them to place their emphasis properly? To look at the whole picture? To consider the long run implications of their actions? George Washington (see above) hinted at the answer in 1789. He said the key was "forethought and arrangement" to "guard against the misapplication of labour."

To get modern ideas you can use in managing for profit, STEEL went to some of the nation's leading management authorities. Their advice is especially valuable today, when metalworking is caught in a severe profit squeeze. In the previous 11 articles in this series, STEEL has set forth the causes of the profit pinch. Beginning with this article, and continuing every other week for the rest of the year, STEEL will present the thinking of leading managers on approaches to solving the problem.

Where Managers Fail

Wheeling Steel Corp.'s Forrest H. Kirkpatrick spells out the causes underlying much of today's profit problem in this list of the ten shortcomings of managers:

1. Failure to develop and train replacements.
2. Failure to delegate responsibility and authority.
3. Lack of clear and appropriate lines of communication.
4. Timidity and buck passing in decision making.
5. Hazy understanding of duties and lack of objectives.
6. Letting emotions and personal feelings enter into decisions.
7. Wasting time on pseudobusiness projects.
8. "Eight-to-fivism"—playing the game, not performing the function.
9. Getting personal ambition and drive mixed up with zest for the success of the enterprise and teamwork.
10. Blaming the government for all troubles.

Let's examine some ways to attack those shortcomings . . .

Know Your Job

"The first thing a thoughtful manager should do is to understand the functional nature of his job and its reason for existence. Far too many people don't know why they're in business." So asserts John Paul Jones, general manager-

'A Hippocratic Oath For Management'

CLARENCE FRANCIS
Chairman, Studebaker-Packard Corp.

"**I BELIEVE** that a business must be run at an adequate profit and must hold its own in fair competition with other businesses. Within my sphere, I will do my level best to keep my business prosperous and strong.

"**I BELIEVE** that business must serve employees, stockholders, consumers, and government, and that management must keep the interests of all these elements in balance. To the extent of my authority, I will try to preserve this balance.

"**I BELIEVE** that management's operating goals are continuously improved productivity and growth—to provide jobs, reward investors, attract capital, and provide more and better goods at lower cost. In any capacity I find myself, I will work toward those goals.

"**I BELIEVE** that the greatest assets of a business are its human assets and that the improvement of their value is both a matter of material advantage and moral obligation; I believe, therefore, that employees must be treated as honorable individuals, justly rewarded, encouraged in their progress, fully informed, and properly assigned, and that their lives and work must be given meaning and dignity, on and off the job. If I have supervision of so much as one other person, I will strive to honor these principles in practice.

"**I BELIEVE** that a reputation for integrity is another priceless asset of any business and that management must deal fairly with customers, competitors, and venders, advertise truthfully, fulfill its commitments, co-operate with other managements in the betterment of business as a whole, and oppose any artificial restrictions that may limit production, fix prices, or restrain trade. In my daily work, I will try to deserve, and make my business deserve, a reputation for integrity.

"**I BELIEVE** that the future of the American economic system depends on the confidence, good will, and understanding of the people, and that business leadership must make itself a responsible part of the human community by participating in worthy activities locally and nationally. As a representative of business and as an individual, I will identify myself and my business with the welfare of people.

"**I BELIEVE** that whenever business has earned a hearing, it has not only a right but a duty to ask for public confidence; and that it must speak freely, give information gladly, and answer the attacks of those who seek to undermine American freedom under democratic capitalism. I will speak out in behalf of my business and the system which it represents.

"**I BELIEVE** finally, that business leadership is nothing less than a public trust; that it must offer a message of hope and courage to all people; and that it can help an economically strong America to lead other nations to lasting prosperity, freedom, and peace. I will work not only for the advancement of myself, my family, and my country, but for liberty and democracy for America and for the world—now and in the years to come."

management personnel services, Union Carbide Corp., New York.

He says that is especially true of staff people. "Staffers produce ideas and costs. They must learn how to produce meaningful ideas at the least possible cost," he says. One approach he advocates is to organize staff functions in the way that gives people the opportunity to apply their talents in a broader sphere. Says Mr. Jones: "One of the more wasteful things industry indulges in today is to force people to run down a long narrow tube, learning more and more about less and less. When it comes time to pick a manager, you have only a surplus of specialists.

"If you'll stop putting people into narrow little boxes and . . . set them toward a clearly defined objective, you'll have a more effective organization with fewer people," declares Mr. Jones.

The late Henning W. Prentis Jr., former chairman of Armstrong Cork Co., wrote in *Top Management Handbook* (McGraw-Hill Book Co., New York, $17.50): "The task of managing is essentially one of teaching. Teaching people to work together is organization. Teaching people to make goods is manufacturing. Teaching people to want goods is advertising. Teaching people to buy goods is selling. Teaching people to understand the operations of an enterprise is public relations.

"No matter how good the teacher, however, he must have good human material to work with if his efforts are to be successful. So the first task of managing is the selection and training of good men and women for line and staff jobs. After all, your competitors have generally the same kinds of bricks, mortar, machinery, and raw materials as yours. Whether an enterprise gains position in the competitive race or falls back depends on one thing only—the quality of brains that are available and the way those brains are trained to be used effectively at the right time."

Know People

You can't use those brains effectively unless you understand people. As Union Carbide's Mr. Jones puts it: "The manager must recognize that his job is not the direction of things but rather the development of people. And people will respond the way you treat them. If you assume that they are naturally lazy, don't like to take responsibility, or don't care about achieving anything, then you have the perfect framework for the kind of management that is not directed to the profit motive. If, however, you assume that people want to work and want to achieve, then it naturally follows that your job, as a manager, is to make it possible for them to do it. The result is usually a strong orientation toward profitability."

The manager must recognize that the art and science of managing are changing constantly. So he must keep informed on new findings in social science research. As the late Mr. Prentis put it: "To be an intelligent citizen in a free society requires a broad knowledge of history, economics, sociology, politics, and religion, together with a deep sense of social responsibility. The same qualifications, coupled with constructive imagination, resourcefulness, and vision, are essential in the higher echelons of business management."

To get the right people into the right jobs requires that you know your people well. American Machine & Foundry Co. has a program under which it keeps full data on each employee. Included: 1. Educational, physical, and experiential assets. 2. Educational self-development. 3. Training. 4. Work interest. 5. Job assignments and qualitative performance. 6. A measure of potential.

AMF's president, Carter L. Burgess, told an American Management Association conference: "At some early time, I wish to see our company additionally employ a technique that is successful for General Electric. Men above a certain level and competence describe their own qualifications in terms of education and experience, update it annually, and have it included as a permanent part of their personnel folder. This is good for the man doing the writing, and it's good information for the company."

Adds Dean Howard W. Johnson of MIT's School of Industrial Management: "Each company must find a way to broaden its internal management selection process as opposed to the tendency to narrow it with the new specialties. Each company must find ways to expose its best people to the broader demands of the business, as opposed to the tendency to encourage good men to specialize. Each company must encourage its people to bring in new ideas—sometimes implicitly critical of presently successful ones, as opposed to the tendency to push the old as long as they work. Each company must expose its good men to different kinds of challenges, different styles of leadership, and different kinds of competition. We must be prepared to move men on more quickly because today's rapid rate of change tends to make them obsolete earlier."

Create the Right Climate

"The best manager is often one who plants the seed of an idea in the mind of a subordinate or into a work situation and carefully avoids providing a detailed map. With a complete plan, program, or technique spelled out down to the last detail, the thought processes of the subordinate tend to stop, and he becomes an automaton as he proceeds with the implementation. With only an idea to work with, he finds himself thinking, creating, and applying the idea to a situation with which he is much more familiar than I am." So says Robert C. Hood, president, Ansul Chemical Co.

Set Real Goals

To impart that perspective, you must set goals and objectives for your company. As LeRoy A. Petersen, president, Otis Elevator Co., declares in *Top Management Handbook*: "Long and short term business objectives are essential for a sense of direction and for the selection of routes to be followed. It is the function of the top manager—whatever his title—to determine and define these objectives and to develop the methods, facilities, organization, and incentive necessary for their attainment. The importance of this responsibility is difficult to exaggerate."

Declares Mr. Jones: "For example, top management may recognize an impending recession but fail to communicate that knowledge down

the line fast enough. Then the top executive may get impatient with the lack of speed in making operating adjustments. When word finally does get down to the operating managers and they adjust to the change in the economic climate, top management already recognizes a reversal in the business trend and wants to step up activity again. The cycle starts all over. Under such circumstances, the acting part of the organization is always behind."

The Union Carbide executive says that the solution involves doing three things: 1. Set meaningful objectives—not just numbers but philosophy too. 2. Communicate those objectives in a clear, definitive manner down the line. They form the framework within which each succeeding level of management can set goals for its group. 3. Be sure all levels of the organization receive the kind of accurate, up-to-date information they need to meet both long and short range objectives.

Mr. Jones points to Maytag Co. as an example. Maytag has a stated objective to build appliances so that they won't require repairs for at least ten years. Presumably, every manager checks any idea or course of action against that objective. For example, if a design engineer found a material he could substitute and save money, he would first have to be sure that the new material would perform its function for ten years. Says Mr. Jones: That kind of stated objective promotes efficiency because it barricades a lot of blind alleys. He says such objectives can be set at any level, but top management should take the initiative and provide the basic principles. Then others can interpret those objectives into courses of action within their own spheres of activity.

Take the plant labor relations function, for example. Suppose it sets for itself the objective to remove all causes of bargaining crises before they reach the crisis stage. That would certainly affect its method of operation. For example, when there is bad feeling between a foreman and a group of craftsmen, the natural tendency is to keep hands off and let the situation flare up in the grievance procedure, or to work on it during negotiation. But with the stated objective, you must seek a solution now.

Objectives will also help to solve what Mr. Jones calls "the plague of industry"—the willingness of competent performers to put up with incompetence from someone else. "Every employee must be made to realize that each dollar paid to the incompetent comes from the pocket of the competent," says Mr. Jones.

Plan for the Long Term

It's easier for your managers to follow the profit path if your company does an effective job of long range planning. William E. Hill, managing partner, William E. Hill & Co., New York consulting firm, reports that the recession spurred a growing number of companies to use long range planning. He says "probably 40 to 50 per cent of metalworking companies with sales of $50 million or more annually have some form of long range plan today." For companies in the $10 million to $50 million range, about 10 to 20 per cent do long range planning, he estimates.

He points out that management is too often engrossed solely in today's problems. Such people are missing the reward of formal corporate planning—the ability to look ahead, see all of the alternatives, and take action now. "The result can be the elimination of important management personnel, wasteful reduction in advertising budgets, weakening of other marketing activities, hampering of necessary product development, and other indiscriminate cost cutting," says Mr. Hill. "Equally important, certain marketing and research budgets should be expanded for immediate and later competitive advantage," he adds.

Asserts John L. Burns, president, Radio Corp. of America: "We are not doing adequate long range planning, and as a nation, we are indisposed to do it, and we are allergic to the idea. But there is no incompatibility between flexible, farsighted goals and our democratic process."

International Nickel Co. Inc., as part of its long range planning program, has developed a method for measuring the growth and decline of customer industries and for "locating industrial markets quickly, with a reliability sufficient for sales planning," C. M. Schwitter, market research manager, told the American Marketing Association today (June 19). Inco is making its market research data available to its customers for use in their marketing planning (see Page 125).

Hupp Corp., Cleveland, follows three simple principles in its profit planning:

1. Build in a sound gross profit. "Pricing in terms of profit means a built-in profit insurance without regard to the outside elements that all too often are used as an excuse for lack of profit," says Don V. Petrone, vice president-sales.

2. Don't kill your profit. You can do that by spending more for sales than you take in. If, for example, a company working on a 15 per cent gross profit margin cuts its price 5 per cent to sustain a competitive position, it will need 50 per cent additional volume to make the same dollar profit, says Mr. Petrone.

3. Stick to accurate sales forecasting. "Too often, wild forecasting, based on guesswork or wishful thinking rather than historical performance and sober analysis, has resulted in overproduction which cannot help but eat into profits," he points out.

Asserts Mr. Petrone: "Clearly, the reason for being in business is to make a profit. With the woods full of fools that want to sell 15 for the price of a dozen without profit to themselves, this fundamental truth has special significance. Unfortunately, many businessmen have forgotten even the fundamentals of how to go about assuring a profit."

PLAN FOR PROFIT GROWTH

Create for Profit Growth

On July 3, STEEL will show how to foster a creative climate that will help spur profits. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

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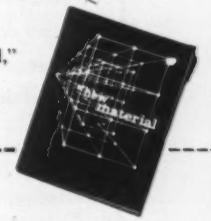

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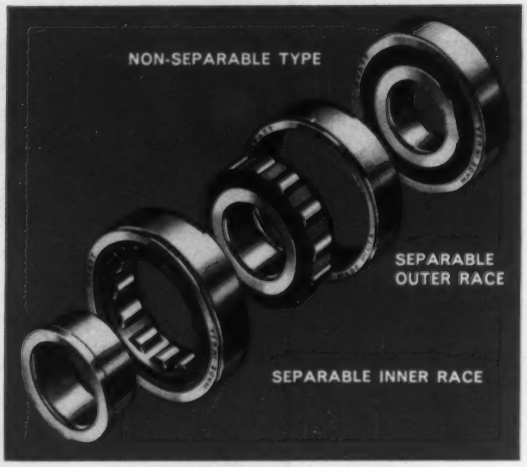

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HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION, HARRISON, N. J.

Corvette Model Run Production

1961*	9,391
1960	10,261
1959	9,670
1958	9,168
1957	6,339
1956	3,467
1955	749
1954	3,655
1953	300

*Through June 12.
Source: Chevrolet Motor Div.

Chevrolet's E. T. Teske (right) tells . . .

How Plastic Corvette Is Built

GM's Chevrolet Motor Div. has turned out 53,000 Corvettes since the 3000 lb sports car was introduced in 1953. Despite perennial rumors, the division has no plans to adopt a steel body. E. T. Teske, general superintendent, Corvette production, says the plastic design is stronger, lighter, and provides better insulation against heat and noise. The body won't rust, and it can be easily patched.

Corvettes are put together on a separate, 350 man line in one corner of Chevrolet's 53 acre car and truck assembly plant in St. Louis. Production runs about 50 cars daily. The 1961 model is expected to reach a record 11,000 units when the line goes down for changeover.

• **Materials**—Polyester resin reinforced with Fiberglas is used to mold the 90 plastic parts that go into each body. The parts are fabricated by Molded Fiberglass Body Co., Ashtabula, Ohio. Major body sections are 0.100 in. thick compared with 0.025 to 0.035 in. steel sheets used in conventional bodies. The finished body with doors, deck, and hood weighs 500 lb before trimming. Stamped metal reinforcements and small parts like window regulators and hinges weigh about 150 lb. They're bolted or riveted in place with aluminum fasteners. A comparable steel body would weigh almost 700 lb.

• **Buildup** — Body assembly starts with shotblasting of major surfaces —which roughens them for better adhesive bonding. The underbody section then is positioned on an assembly dolly, and stamped steel rocker panel plates are riveted in place. A master fixture is centered on the underbody to insure proper locating of other parts.

As the dolly moves along, more parts are "bonded" on with a polyester resin adhesive that has an asbestos filler. The adhesive contains a catalyst and promoter to complete chemical reaction. About 40 lb are used on each car. The adhesive is mixed in small batches at assembly points, poured into paper cones, and squeezed out onto plastic much like a cake is decorated. It sets in about 6 minutes.

• **Finishes**—After the body is assembled, it's sanded, and a plastic filler is wiped on by hand. Gray and red primer coat are sprayed on and baked. Bodies are wet sanded. Care must be taken not to sand past the red "indicator" coat. The bodies then go back through the first spray booth for a sealer application.

When the sealer is dry, each

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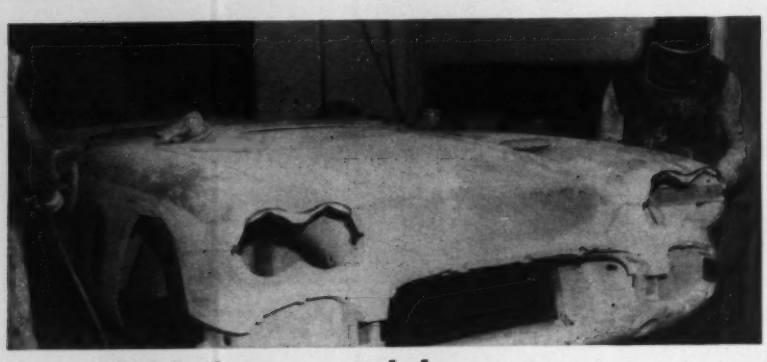
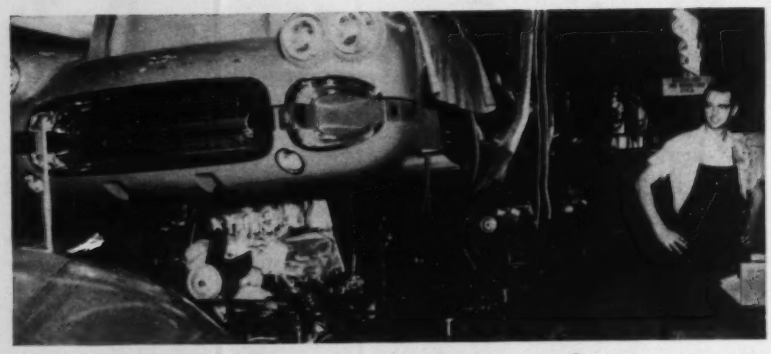
Plastic underbody is positioned on dolly . . .



Assembled bodies are sanded . . .



Bodies join chassis at rate of six per hour . . .

Four minute shower spots any leaks

body gets three layers of acrylic lacquer with a bake and oil sand after the first and second coats and a buffing operation after the final coat. White is the most popular of the seven colors available this year. Exterior trim and some standard accessories like seat belts are installed after the painting.

• **Assembly**—Chassis are built up on an adjoining line. A. O. Smith Corp., Milwaukee, makes the side rail X-frames. Corvettes have independent, coil suspension in front and leaf springs in the rear. Spring rates of 110 and 115 lb per inch at front and rear wheels help achieve sports car handling characteristics. The basic engine block is Chevy's 283 cu in. job. Five horsepower ratings (from 230 to 315) are offered. Three and four speed manual transmissions and automatic Powerglide are available—as are 12 axle combinations. About 11 per cent of this year's production is equipped with fuel injection. The cars also feature an aluminum crossflow radiator.

Assembled cars are test driven around the plant and back inside where they're water tested for 4 minutes. Final repairs are made and interior trim added. The 178 in. long Corvette lists for $3934.

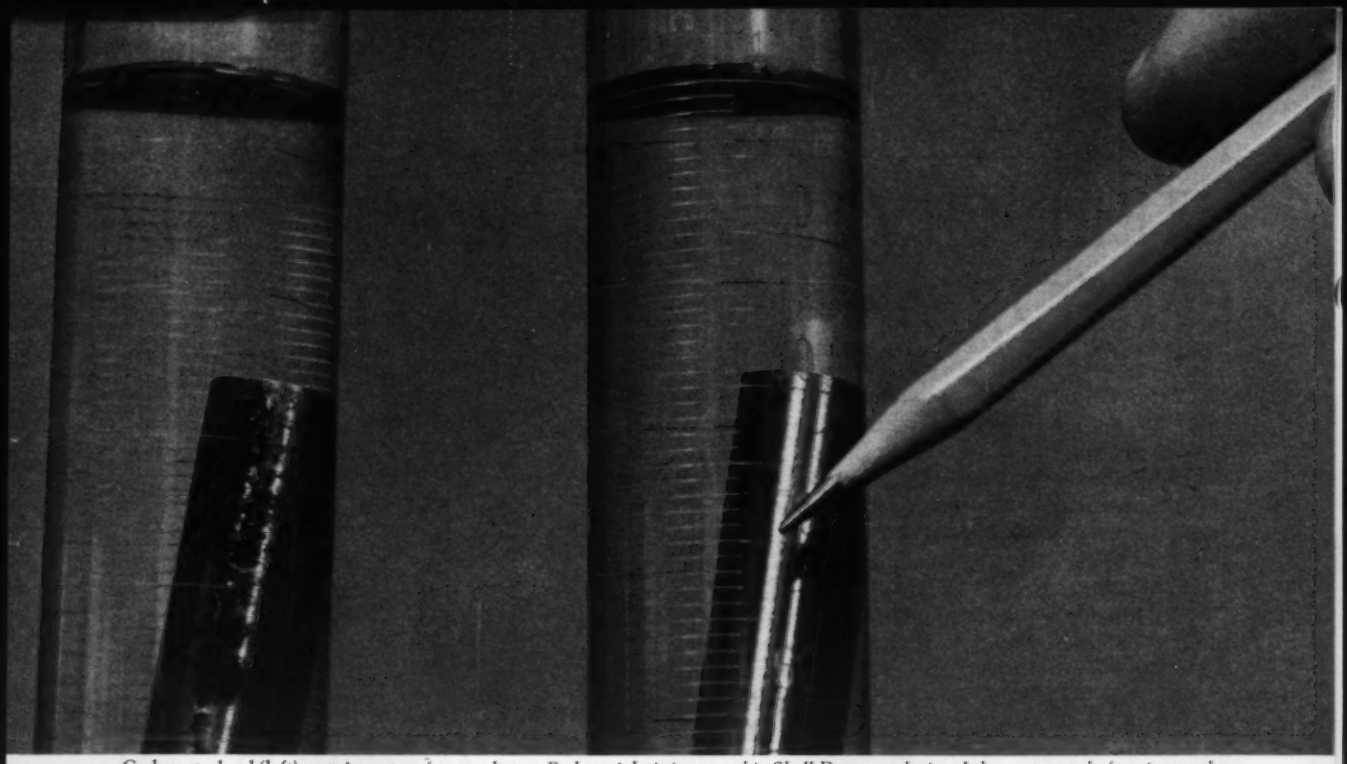
U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
5 Mo. Totals	2,117,243	3,196,358
June		613,136
July		434,377
August		305,514
September		407,691
October		617,972
November		597,638
December		523,422
Total		6,696,108

Week Ended	1961	1960
May 13	129,402	145,917
May 20	123,528	154,755
May 27	129,142	142,359
June 3	85,645	115,068
June 10	127,259†	139,423
June 17	125,000*	137,641

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.



Carbon steel rod (left) rusts in water after two hours. Rod on right is immersed in Shell Dromus solution. It has not rusted after six months.

REPORT:

Shell reports on ten features of Dromus Oils that can help you reduce cutting time and costs

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3. Dromus Oils contain an effective germicide. Result: less danger of rancidity and bacterial growth.

4. Dromus Oils do not separate. Even when mixed into emulsions containing more than 50 parts' water, Dromus Oils maintain their stability.

5. Dromus Oils prolong grinding wheel life. They prevent the wheel from "loading up" with metal from the work.

6. Dromus Oils provide effective corrosion protection for tool and workpiece. (See photograph above)

7. Dromus Oils permit greater dilution than many soluble oils.

8. Dromus Oils wash away metal chips with high efficiency. Chips then settle out of the emulsion.

9. Dromus Oils can be kept in the machine during plant shutdowns.

10. Dromus Oils are made under strict controls. Manufacture of Shell Dromus Oils is scientifically controlled.

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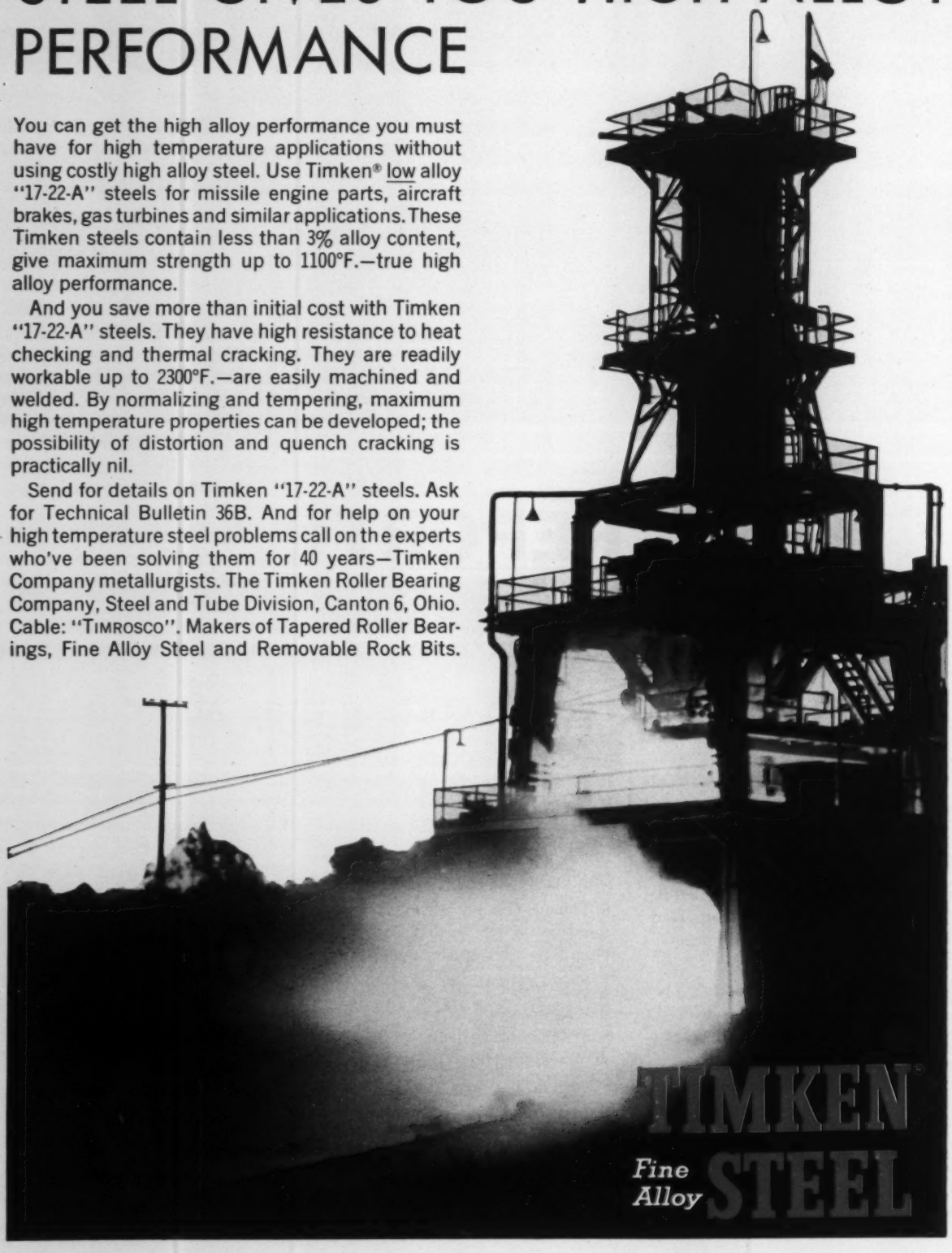

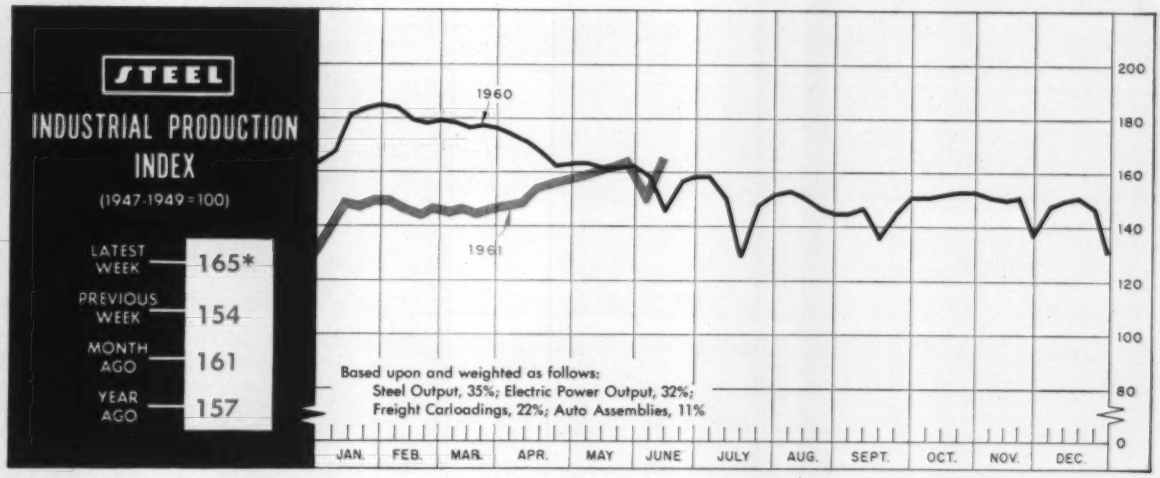

*Week ended June 10.

Metalworking Upturn Lags Economy

THERE'S no question that the nation's economy as a whole is experiencing a bona fide recovery. But many workaday metalworking businessmen are scanning the optimistic forecasts and asking: "When is it going to affect me?"

In the last four weeks, STEEL has visited five important metalworking centers—Dayton, Ohio; Cincinnati; Detroit; Erie, Pa.; and Buffalo—to ask one question: How is business? The answer: There has been a slight improvement, but nothing like the forecasters have been predicting for the general economy. In fact, quite a few of the businessmen—presidents, sales managers, market analysts, treasurers—are still trying to figure out where the 2.5 per cent improvement in the Federal Reserve Board's industrial production index in April came from.

● **Hopes Are High** — Feeling the slowest pickup are makers of capital goods such as machine tools and heavy presses. Makers of smaller machinery and components are not much better off. However, one metalworker expressed the general feeling when he told STEEL: "I'm still expecting a good pickup later in the year. I have to go with what the professional economists say, but my own order books don't show any signs of the kind of upturn they are predicting."

● **Six Biases**—It must be recognized that such reactions are biased to some extent.

First of all, the cities visited have all been hit harder than areas less dependent on metalworking. (Like most postwar recessions, the last one was centered in durable goods.)

Second, industry in the areas is heavily concentrated in the capital goods sector of metalworking. Usually, that is the last sector to feel an upturn in the business cycle.

Third, unemployment has been plaguing at least two of the cities —Detroit and Erie—for a long time

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,030[1]	2,042	1,775
Electric Power Distributed (million kw-hr)	14,500[1]	13,887	14,147
Bituminous Coal Output (1000 tons)	7,660[1]	7,980	7,849
Crude Oil Production (daily avg—1000 bbl)	7,050[1]	7,061	6,772
Construction Volume (*ENR*—millions)	$662.0	$399.9	$482.0
Auto, Truck Output—U. S., Canada (*Ward's*)	160,372[1]	112,153	174,274
TRADE			
Freight Carloadings (1000 cars)	600[1]	531	648
Intercity Truck Tonnage (changes from year ago)	−0.5%	−1.1%	−14.5%
Business Failures (Dun & Bradstreet)	254	368	274
Currency in Circulation (millions)[2]	$32,198	$32,055	$31,917
Dept. Store Sales (changes from year ago)[2]	+1%	−1%	−13%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$29,090	$23,275	$26,114
Federal Gross Debt (billions)	$290.1	$289.9	$289.3
Bond Volume, NYSE (millions)	$29.9	$18.0	$28.9
Stocks Sales, NYSE (thousands of shares)	19,722	11,797	17,506
Loans & Investments (billions, adjusted)[3]	$112.1	$111.9	$102.9
U. S. Govt. Obligations Held (billions)[3]	$31.4	$31.2	$25.8
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	223.1	222.4	231.8
All Commodities[6]	118.9[1]	118.9	119.6
Commodities Other than Farm & Foods[6]	127.8[1]	127.8	128.3

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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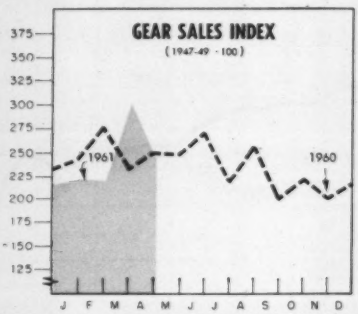
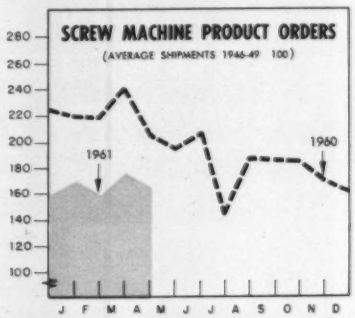
Chicago, Ill.—Greensboro, N. C.

THE BUSINESS TREND



	Bookings 1961	Bookings 1960	Shipments 1961	Shipments 1960
Jan.	220.8	243.4	227.3	207.3
Feb.	218.3	278.6	214.4	230.2
Mar.	299.3	231.8	246.8	244.6
Apr.	246.2	249.2	233.9	234.8
May	....	246.9	....	241.3
June	....	269.8	....	253.6
July	....	217.5	....	210.8
Aug.	....	255.8	....	217.3
Sept.	....	197.9	....	223.5
Oct.	....	219.9	....	220.6
Nov.	....	198.9	....	226.7
Dec.	....	216.5	....	220.0
Avg	....	235.5	....	227.6

American Gear Mfrs. Assn.
Charts copyright, 1961, STEEL.



	New Orders 1961	New Orders 1960	Shipments 1961	Shipments 1960
Jan.	153	209	171	220
Feb.	154	207	160	219
Mar.	205	198	177	241
Apr.	165	174	166	205
May	...	178	...	195
June	...	175	...	207
July	...	152	...	143
Aug.	...	166	...	188
Sept.	...	166	...	186
Oct.	...	152	...	185
Nov.	...	173	...	168
Dec.	...	151	...	161
Avg	...	175	...	193

*Preliminary.
National Screw Machine Products Assn.

and has been a fairly serious problem in the others in recent months. There has been slight improvement since April, but not enough to take any of them out of the government's classification of "relatively substantial unemployment."

Fourth, three of the five are heavily dependent on the auto industry, which has shown firmness but not great strength.

Fifth, the improvement to date still leaves most industries and individual companies behind their year-ago positions, despite the fact that the decline had already started at that time.

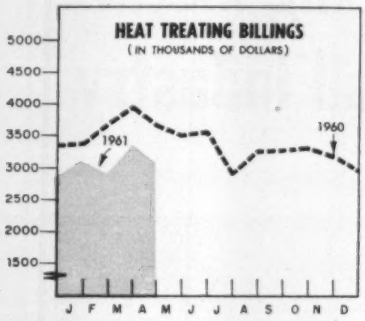
And sixth, wherever STEEL went, the conversation eventually turned to profits and turned optimism into dejection.

• **Difference of Opinion**—In view of those circumstances, it is not surprising (some say it's even encouraging) to find metalworkers taking exception to economic forecasts of near boom proportions by the end of the fourth quarter. They reason that a mild but steady increase throughout 1961 will enable them to meet demand in a more orderly and efficient manner. They also feel that a boom will only lead to a later bust.

Inventory levels will play a major part in the pattern of business later this year, and again the metalworkers differ with some economists. They feel that many businessmen have learned a few lessons on inventory control during the last two recessions. Also, they have tools and concepts now for inventory control which were not available five or ten years ago. But the economists are inclined to believe that when orders begin to mount significantly, manufacturers will revert to former practices and build stocks rapidly.

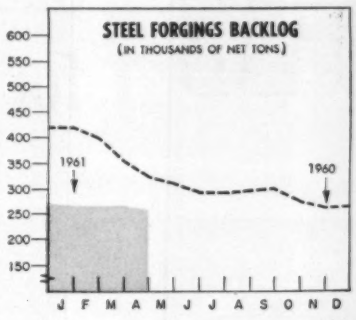
• **Point of Agreement**—It was encouraging, though, to find that not 1 person out of more than 25 interviewed felt that we were in a false upturn. What's more, even in the hardest hit areas conditions are such that local businessmen expect steady improvement this year. In Erie, where unemployment is running close to 12 per cent of the work force, one manager remarked: "This is the wealthiest distressed area you ever saw."

One of the phenomena of the recession is the way personal income has held at extremely high levels. Personal savings have climbed steadily for several years.



	1961	1960	1959
Jan.	3,171.6	3,381.6	2,769.1
Feb.	2,942.3	3,698.8	2,828.0
Mar.	3,393.3	3,921.9	3,273.8
Apr.	3,140.9	3,642.6	3,316.1
May	.....	3,509.4	3,302.8
June	.....	3,548.4	3,512.2
July	.....	2,899.7	3,302.1
Aug.	.....	3,266.0	3,162.8
Sept.	.....	3,281.7	3,263.8
Oct.	.....	3,306.8	3,531.2
Nov.	.....	3,165.5	3,092.2
Dec.	.....	2,925.2	3,357.2

Metal Treating Institute.



	Shipments		United Orders	
	1961	1960	1961	1960
Jan.	95	123	266	420
Feb.	89	130	263	398
Mar.	96	138	262	356
Apr.	96	117	256	325
May	...	110	...	312
June	...	110	...	295
July	...	79	...	295
Aug.	...	88	...	299
Sept.	...	94	...	302
Oct.	...	97	...	277
Nov.	...	93	...	265
Dec.	...	90	...	268

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

Many observers feel that once the consumer works out of a recession psychology, he will be more than able to give the economy the push it needs. Consumer attitude studies this spring did not indicate he was willing to step up purchases of durables greatly, but the rash of good news may be changing his mind.

Economists See Vigorous Rise

And much of that good news is still coming from the professional economists whose job it is to constantly study and interpret business developments. Says the First National City Bank of New York: "The marked increase in industrial activity during April and May has erased any lingering doubts that the economy is in a very encouraging rebound from recession lows . . . The recovery is on a broad base, encompassing all major industrial sectors . . . It seems reasonable to figure that by now half the decline in industrial production has been made up."

From Morgan Guaranty Trust Co. of New York comes the observation that the recovery since February "compares favorably, on the whole, with that in the initial stages of previous postwar revivals . . . Preliminary indications are that GNP in the current quarter will approximate $510 billion (annual rate)."

The Federal Reserve Bank of Chicago adds: "Now it appears that the uptrend, in its initial stages at least, may resemble the sharp revival of 1958 rather than the sluggish improvement from the low point in 1954. The recent surge in production and manufacturers' new orders is not based primarily upon an increase in sales of products to final users. Rather, the acceleration in the upswing stems largely from the same source as the 1960 decline in activity—a sharp change in business inventory policy."

Buyers Still See Liquidation

On the other hand, inventories are still being cut, observes the National Association of Purchasing Agents. In its May report, the Business Survey Committee says the rate of decline has slowed, but those reporting lower stocks still outnumber those showing increases. "Certainly, the business improvement noted in the other indicators (increased orders, production, and employment) cannot be attributed to any inventory accumulation."

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Ohio Rolls

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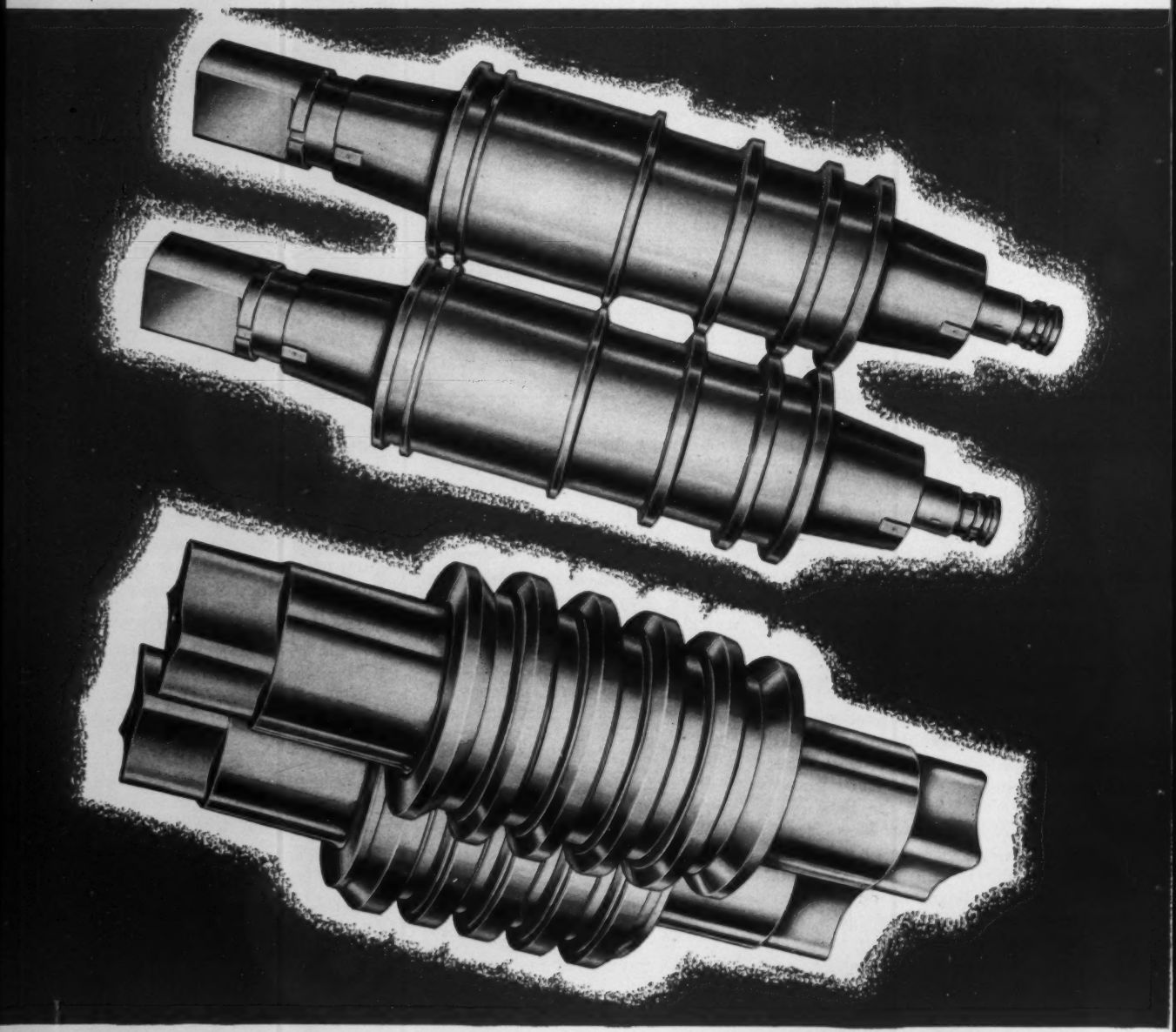

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Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

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OR-48

FRANK J. SHANABERG
American Welding v. p.

W. S. DOREMUS
Diamond Wire Spring exec.

WILLIAM F. OSWALT
Stanley Wks. exec. v. p.

ROY E. LAMBERT
Link-Belt plant gen. mgr.

Frank J. Shanaberg was named to the new post of vice president-marketing, **American Welding & Mfg. Co.**, Warren, Ohio. He is succeeded as manager of sales, Industrial Products Div., by **Parnell J. Porter**, who was formerly general sales manager, Taylor-Wharton Iron & Steel Co.

James A. Roemer was elected president of **Sharon Steel Corp.**, Sharon, Pa., in addition to his duties as chairman, following resignation of **Alfred M. Tredwell Jr.** as president. Mr. Tredwell will continue as a consultant.

R. E. Wells was elected president of **Chicago Foundry Co.**, Chicago, to succeed **R. L. Wells**, chairman. **Charles E. Fausel**, plant superintendent, was elected vice president-operations.

F. Kenneth Iverson was appointed executive vice president of **Coast Metals Inc.**, Little Ferry, N. J. He was sales manager of Cannon-Muskegon Corp.

W. S. Doremus was named executive vice president, **Diamond Wire Spring Co.**, Pittsburgh. He was general manager.

William F. Oswalt was elected executive vice president, **Stanley Works**, New Britain, Conn. He fills the post vacated by **Howard L. Richardson**, who became president last March. Mr. Oswalt was with General Electric Co. Most recently, he was general manager in Erie, Pa., for three divisions of direct current motor and generator operations.

William E. Shenk was appointed vice president, **Abbey Etna Machine Co.**, Perrysburg, Ohio. He had served with U. S. Steel Corp., American Transformer Co., and McKay Machine Co.

William S. Coleman Jr., senior liaison engineer of General Motors Research Laboratories, was made chief administrative engineer at **Motec Industries Inc.**, Hopkins, Minn.

Roy E. Lambert was made general manager of **Link-Belt Co.**'s bearing plant in Indianapolis to succeed **Raymond S. Wood**, retired.

William R. Donnelly was appointed president of **Chrysler Corp.**'s Amplex Div., Detroit. He succeeds **William P. Balthrop**, recently appointed president of the Airtemp Div., also a part of Chrysler's Special Products Group. **Irving J. Minett**, group executive-defense, was named group executive and chief operating officer of Chrysler's International Operations Group. **David M. Borden** was made chief engineer-automotive research for Chrysler's Engineering Div.

Otis J. Adams was named chief engineer of **Bartlett-Snow Div.**, Bartlett-Snow-Pacific, newly formed by purchase of C. O. Bartlett & Snow Co. by Pacific Foundry & Metallurgy Co. His headquarters are at the Cleveland plant.

Clifford Amend was appointed met-

F. KENNETH IVERSON
Coast Metals exec. v. p.

WILLIAM E. SHENK
Abbey Etna Machine v. p.

WILLIAM S. COLEMAN JR.
joins Motec Industries

OTIS J. ADAMS
Bartlett-Snow chief eng.

THOMAS R. ARNDT
Litho-Strip mfg. mgr.

A. R. JOHNSON
Vanadium-Alloys research

STEPHEN A. FRONEK
Crucible silicon steel sales

DONALD E. SPACKLER
Moloney Switchgear post

allurgist at **Ajax Magnethermic Corp.**, Youngstown.

Thomas R. Arndt was made manufacturing manager of the Chicago plant of **Litho-Strip Corp.** He was general manager, Modern Fabricating & Welding Co.

A. R. Johnson was made manager; **Daniel H. Yates** assistant manager, Research Dept., **Vanadium-Alloys Steel Co.**, Latrobe, Pa.

Donald P. Jones was made Eastern sales manager, **Southworth Machine Co.**, Portland, Maine.

Charles M. Bray was made San Francisco division manager for **Connor Spring Mfg. Co.**

George W. Spencer was named engineering manager of **Erie-Pacific**, Hawthorne, Calif., division of Erie Resistor Corp. He was engineering supervisor of a Minuteman Test Requirements & Evaluation Group at North American Aviation's Autonetics Div.

Stephen A. Fronek was appointed product sales manager of silicon steels for **Crucible Steel Co. of America**, Pittsburgh. He formerly was plant manager at Park Works, Pittsburgh, which closed. He has since been staff assistant to the director of technology.

Bernard B. Winger was named director of administration and defense contracting for **Data Recorders Div.**, Pasadena, Calif., Consolidated Electrodynamics Corp., subsidiary of Bell & Howell Co.

Truman H. Cline was made manager of engineering, **Stevens Mfg. Co. Inc.**, Mansfield, Ohio.

John E. Polis was promoted to manager, Molecu-Dryer Div., **C. I. Hayes Inc.**, Cranston, R. I.

William T. Davis was appointed supervisor of manufacturing engineering for **Air Reduction Sales Co.**'s Cryogenic Engineering Dept., Plainfield, N. J. He was a regional engineer in Airco's Eastern regional office.

Donald E. Spackler was made general manager of **Moloney Electric Co.**'s new Switchgear Div., St. Louis. He has been a vice president of the company for the last seven years.

Darrel Bryan, sales promotion manager, was made general sales manager, **Lima Electric Motor Co. Inc.**, Lima, Ohio, subsidiary of Consolidated Diesel Electric Corp.

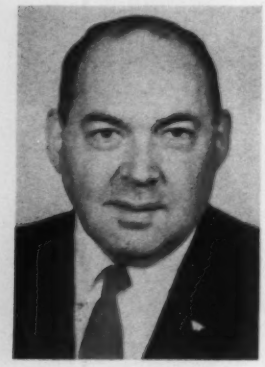
Joseph P. Larson was made quality control manager; **Raymond S. Francekovic** plant manager at the turbo products plant in Buffalo of Metals Processing Div., **Curtiss-Wright Corp.**

George Bearer was made sales engineer, Rolling Mill Div., Salem, Ohio, **E. W. Bliss Co.**

Kenneth S. Cowlin was named to the new post of general sales manager, **Electro Refractories & Abrasives Corp.**, Buffalo. He was sales manager, Grinding Wheel Div.

John E. Meyers was made manager

GEORGE W. SPENCER
Erie-Pacific eng. mgr.

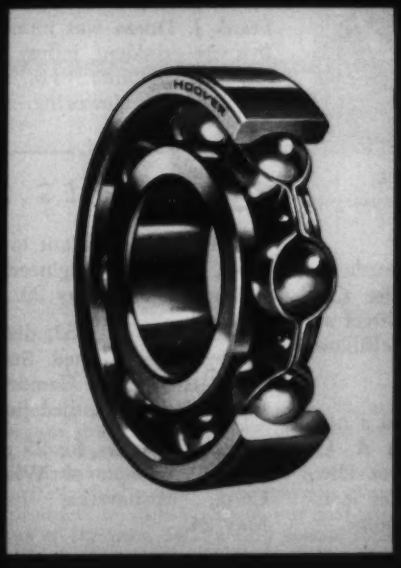


JOHN E. POLIS
C. I. Hayes div. post

WILLIAM T. DAVIS
Airco cryogenic eng. post

KENNETH S. COWLIN
Electro Refractories post

so quiet . . .



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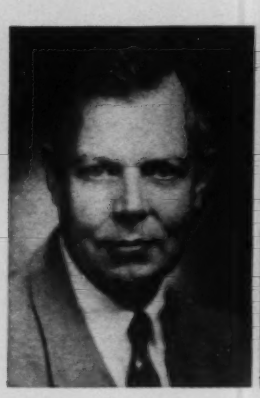
Signode senior v. p.

R. L. DURGIN
Illinois Gear v. p.

ALBERT J. BOOTH
Stewart Die Casting post



N. R. FARSJE
Gould-National Batteries post

ALFRED H. MUNKENBECK JR.
Brakeshoe Internat. pres.

FRANK J. DURZO
Jeffrey Mfg. exec. v. p.

SHERWOOD J. BASCH
Morton Mfg. v. p.

GEN. H. A. MARKLE JR.
Fuller eng. director

W. M. ASHER
A. O. Smith sales post

of **Koppers Co. Inc.'s** Coupling Dept., Baltimore.

Sherwood J. Basch was promoted to vice president-engineering, **Morton Mfg. Co.**, Muskegon Heights, Mich.

W. E. Dreusike was made sales manager, **Yuba Erectors Div.**, Emeryville, Calif., Yuba Consolidated Industries Inc.

Gen. H. A. Markle Jr. was made director of engineering, **Fuller Co.**, Catasauqua, Pa. He will direct all divisions, subsidiaries, and affiliates of the company.

W. M. Asher was named to a new sales management post at **A. O. Smith Corp.'s** Electric Motor Div., Tipp City, Ohio. He is sales manager for vertical pump motors.

Signode Steel Strapping Co., Chicago, appointed **John M. McGregor** senior vice president; **Hobart P. Young** vice president in the Manufacturing Div.; **Joseph F. Beckman** and **Milton C. Carlson** vice presidents and **A. N. Perry** assistant vice president in the Sales Div.; and **Hugh Bunten** vice president-secretary.

R. L. Durgin was elected a vice president of **Illinois Gear & Machine Co.**, Chicago.

Albert J. Booth was made general manager of the Chicago plant of **Stewart Die Casting Div.**, Stewart-Warner Corp. He was head of the division's Bridgeport, Conn., plant, and moved to Chicago Apr. 1 as assistant to L. G. Vanderhoof, vice president of Stewart-Warner, and general manager of the division.

N. R. Farsje, vice president-automotive battery sales, **Gould-National Batteries Inc.**, St. Paul, was named vice president-director of automotive and general sales. He is succeeded by **Benjamin O. Dalbey** as general sales manager, Automotive Battery Sales Div. **Hale H. Bockstruck** replaces Mr. Dalbey as sales manager, automotive battery brand sales.

Alfred H. Munkenbeck Jr. was elected president and chief executive officer of **Brakeshoe International S. A.**, Swiss subsidiary of American Brake Shoe Co. He was named general manager of the subsidiary in July, 1960, and is based in Geneva.

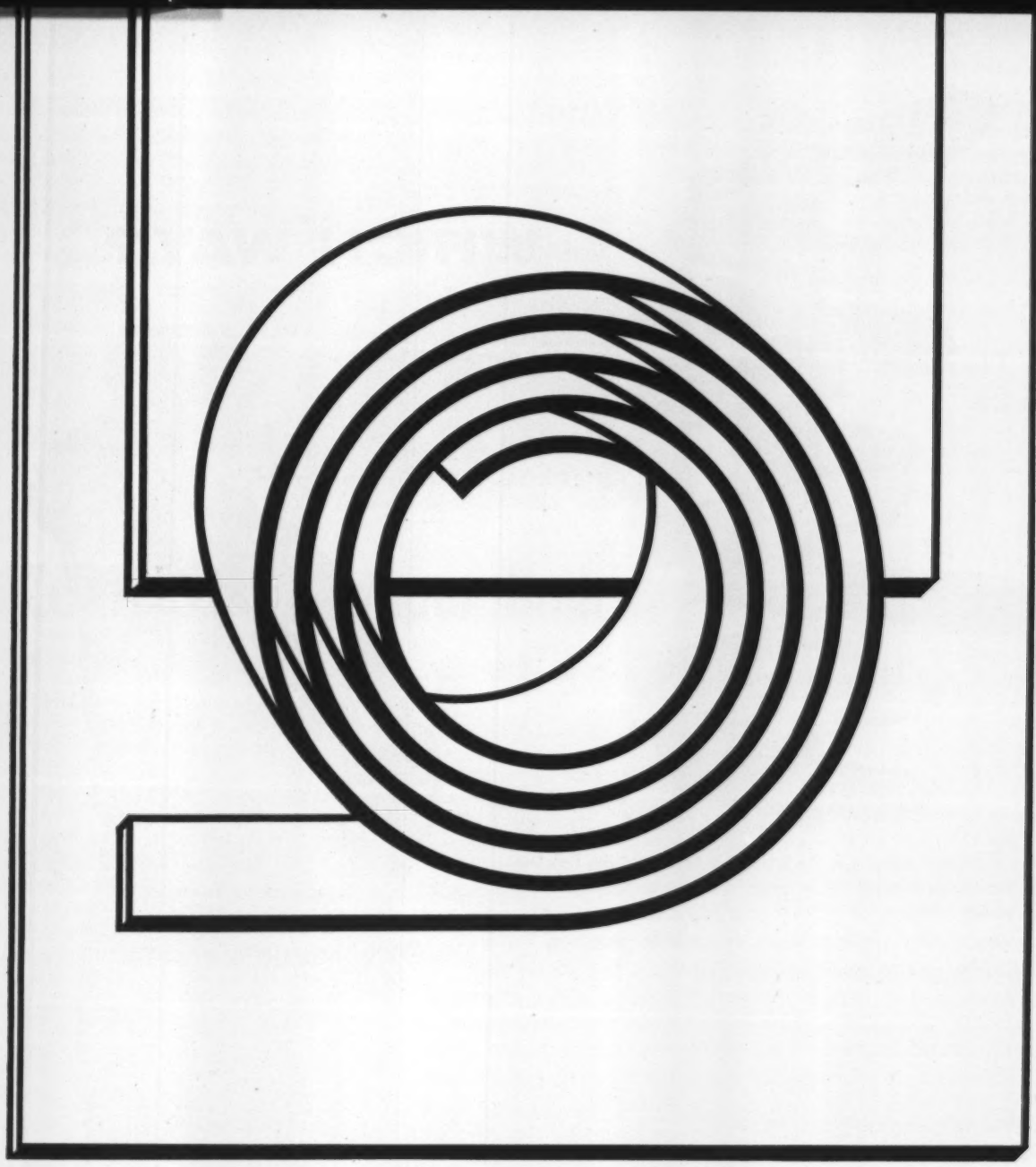
Frank J. Durzo was named executive vice president, **Jeffrey Mfg. Co.**, Columbus, Ohio. He was vice president-manufacturing.

OBITUARIES...

Egil T. Risan, assistant to the president, **Sutton Engineering Co.**, Pittsburgh, died May 29.

David O. Merrill, 52, district sales manager for **United States Steel Products Div.** in Camden, N. J., U. S. Steel Corp., died June 5.

Vernon S. Spears, for 25 years with the Sales Dept. of **Wheelabrator Corp.**, Mishawaka, Ind., died May 24.



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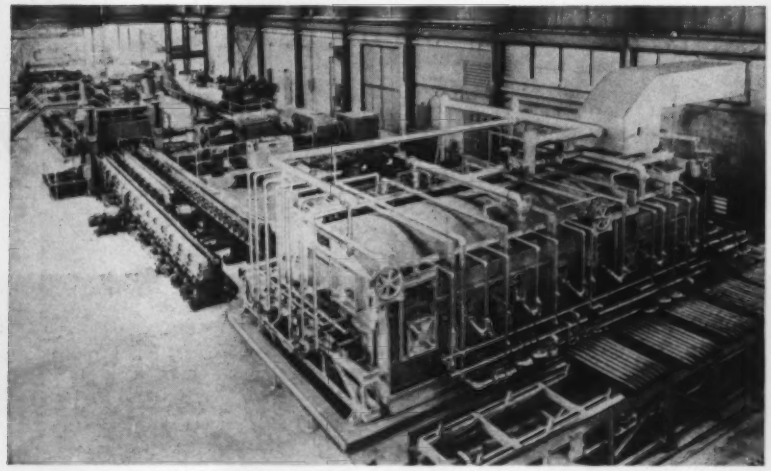


Continental Copper Builds Automated Rolling Mill

ONE ENGINEER in a pulpit overlooking this new copper rolling mill controls all operations from furnace to rod coiler and tier.

Besides the engineer, operating personnel required are an overhead crane operator who loads copper bars on the furnace conveyor and a fork lift truck operator who removes finished coils. Including maintenance men, the plant has a staff of eight. (About 20 men are required to operate a conventional mill, depending on the degree of mechanization.)

The $3 million facility at Linden, N. J., is operated by the Hatfield Wire & Cable Div., Continental Copper & Steel Industries Inc., New York. It produces 5/16 in. diameter, copper rod and has a rated hourly capacity of 16.7 tons.

• **Fully Automated** — Three men working an 8 hour shift can turn out 217 miles of copper rod (enough to stretch from New York to Washington). From the moment 265 lb bars of pure electrolytic copper are fed into the 1700° F furnace (every 27 seconds) until the rod rolls out of the last stand at 2800 fpm to be automatically coiled and tied, no human handling is required.

The 45,000 sq ft, L-shaped, single level building is so designed that the control engineer can watch every stage of the operation. Controls are concentrated in a single console.

The rolling mill and an adjacent, new, $7 million, rubber insulating mill are part of a projected manufacturing complex, says M. S. Gordon, president. Plans call for a 100,000 sq ft wire drawing mill, to fabricate copper and aluminum wire from rod, a plant for the production of plastic coated wire and cable, office buildings, and (eventually) a refinery to produce electrolytic copper bars from ore.

National Buys Pipe Mills

National Supply Div., Armco Steel Corp., Middletown, Ohio, awarded a contract to Aetna-Standard Div., Blaw-Knox Co., Pittsburgh, for construction of a stretch reducing, tube mill. The 24 stand mill will be part of the combination pipe mill facilities to be installed in the expanded Ambridge, Pa., plant. It will be used for the sizing and stretch reducing of seamless, continuous buttweld, and electricweld pipe in a size range from nominal ½ in. to 8⅝ in. OD. Capacity of the mill: 80 tons per hour, or a maximum finishing speed of 2000 fpm.

The contract also includes cooling beds, conveyors, a hot saw, and a four stand, semiclosing mill and a four stand, buttwelding mill for the production of continuous buttweld pipe. In the production of the latter, the skelp first will be cold formed on a new electricweld pipe mill which also will be installed at the Ambridge plant.

MPB Forms Division

Miniature Precision Bearings Inc., Keene, N. H., formed a Precision Products Div. to design and manufacture nonstandard bearings, bearing shaft assemblies, and component assemblies in which precision bearings are used.

Coal Mine to Be Developed

A new coal mine having an annual capacity of 1.2 million tons will be developed jointly by Republic Steel Corp., Cleveland, and Island Creek Coal Co., Huntington, W. Va. A new corporation, Beatrice Pocahontas Co., will be formed by the two companies. The mine will require a multimillion dollar investment and will yield a high quality, metallurgical coal. The mine plant will be situated near Grundy, Va.

Superior Tube Expanding

Superior Tube Co., Norristown, Pa., plans to enlarge its main plant at Collegeville, Pa., at a cost of about $500,000. About 15,000 sq ft of a 50,000 sq ft addition will house the firm's Nuclear Production Div. which fabricates components for nuclear reactors. The division is presently in Phoenixville, Pa.

Covel Buys Lathe Line

Covel Mfg. Co., Benton Harbor, Mich., acquired from Wade Tool Co., Waltham, Mass., its line of precision lathes, including hand turret lathes, finishing lathes, and toolmaker lathes.

Corporate Names Changed

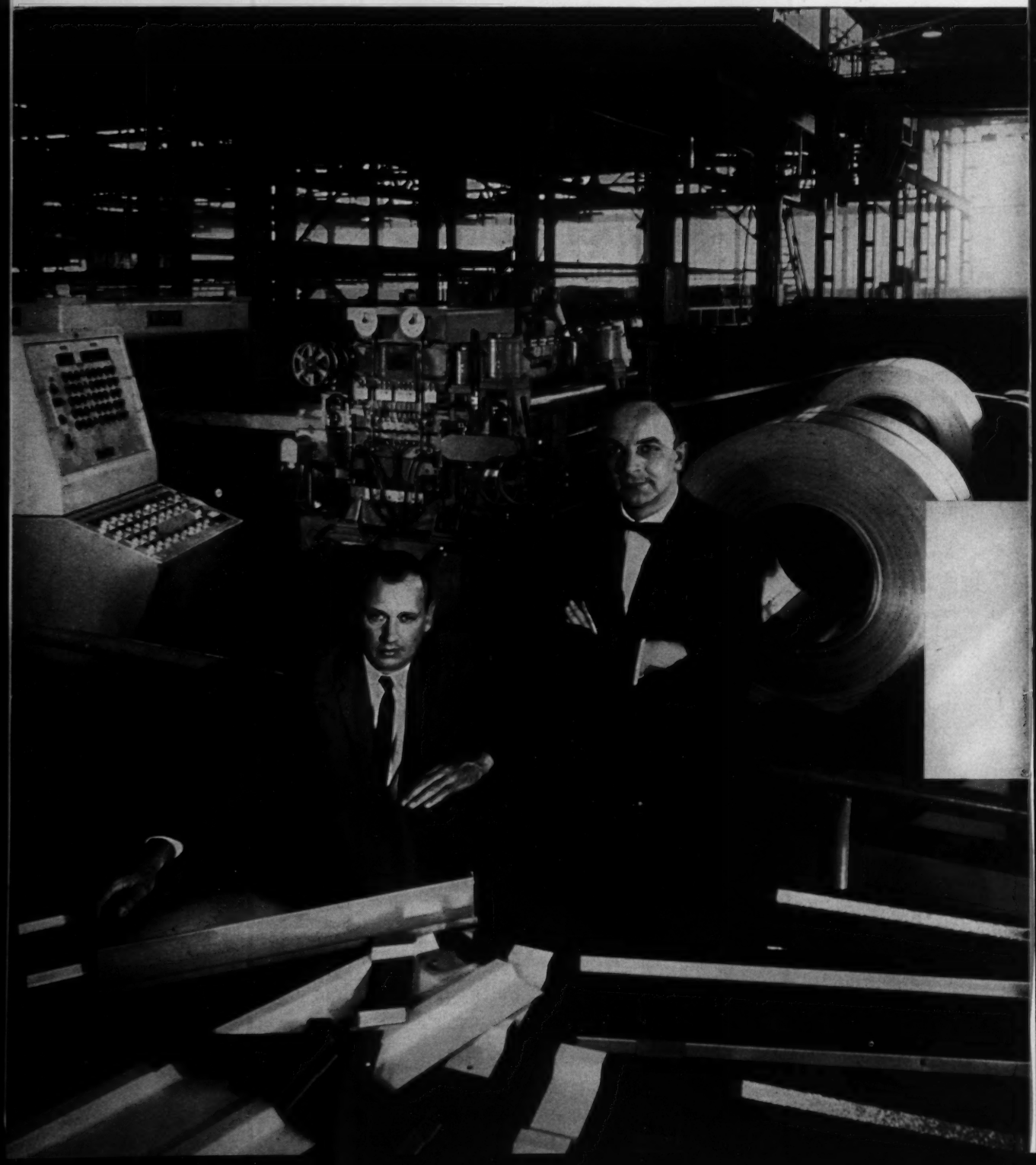
Indiana Cap & Set Screw Co., Franklin Park, Ill., changed its name to Fastron Co.

(*Please turn to Page* 76)

This is McKay

McKAY DIE SHEAR LINES CUT MORE THAN STEEL. The most economical and efficient shear lines in operation today, they are being used by dozens of leading metal producers, fabricators and warehouses to slash shearing costs. Here, McKay Sales Manager Joseph F. Lyden, Jr., and M. G. Slaney, Building Division Manager, The Parkersburg (W. Va.) Rig and Reel Company — one of the nation's fastest growing manufacturers of pre-engineered metal buildings — examine panel sections cut to length by the high speed McKay Die Shear Line in the background.

Photo by Arnold Newman



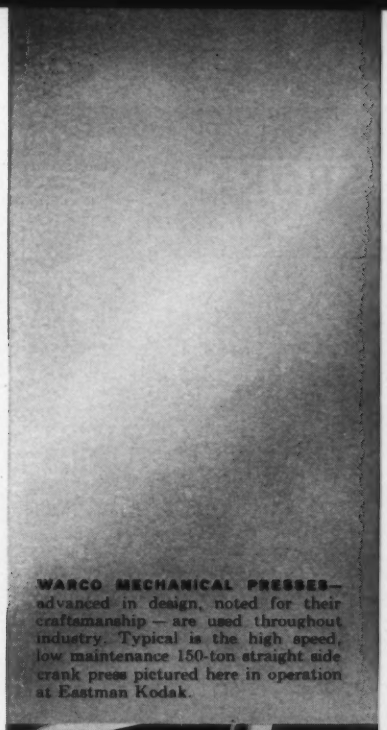
Machine....

a recognized leader in the development and manufacture of high production metal processing equipment!

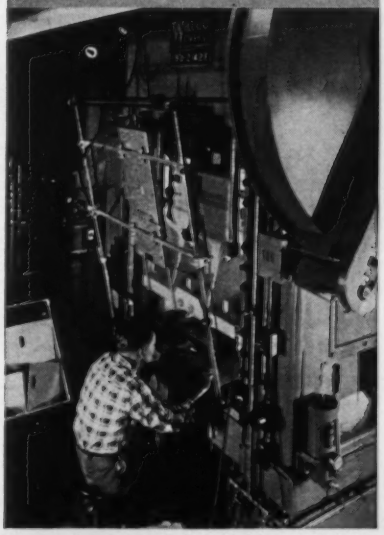
If you fabricate metals and are caught in the "profit squeeze" you'll want to know more about McKay Machine.

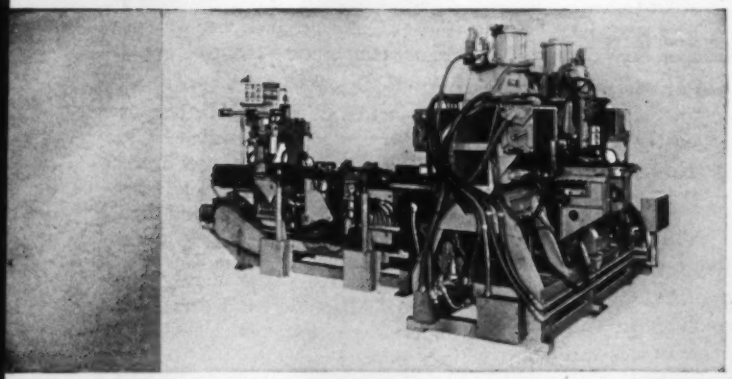
It was McKay Machine that pioneered automated integrated production lines, and it is McKay Machine that is today a leader in this field. We have conceived and produced complete lines for the manufacture of building panels, aircraft and missile sections, appliances, cabinets and components, automotive bodies and parts, and farm equipment—lines that are completely automated from *raw material to finished part or product.*

Whatever you make, if it requires metal handling, feeding, slitting, shearing, stamping, welding or forming, it's just good business to acquaint yourself with *McKay Packaged Production Lines*—high speed production equipment engineered to work in unison—with one-source responsibility from start to finish. Write for literature to *The McKay Machine Company, Youngstown 1, Ohio.*



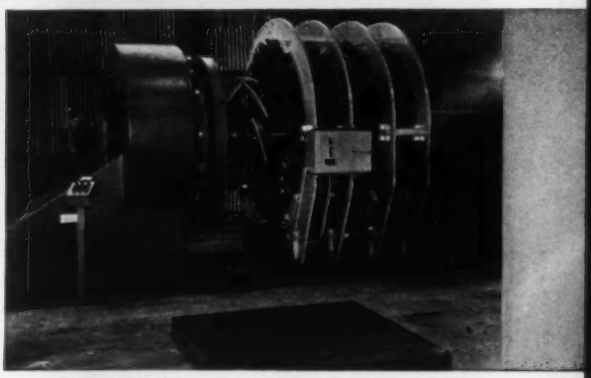
WARCO MECHANICAL PRESSES—advanced in design, noted for their craftsmanship — are used throughout industry. Typical is the high speed, low maintenance 150-ton straight side crank press pictured here in operation at Eastman Kodak.



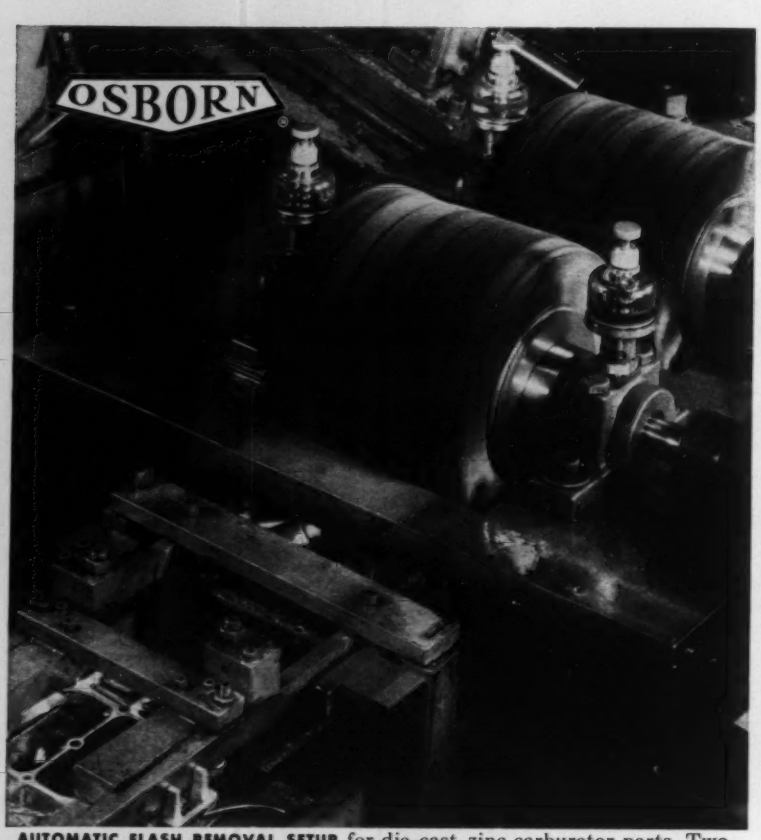


FEDERAL RESISTANCE WELDERS AND WELDING LINES, like this multi-gun combination spot and projection welder used by Hotpoint on their range production line, can be found in the plants of leading metalworking firms the nation over. Individual units, or complete resistance welding lines, are engineered to specifications by McKay's Federal-Warco Division.

LOOK TO McKAY McK MACHINE



BERKELEY-DAVIS AUTOMATIC ARC WELDING MACHINERY produced by Berkeley-Davis, Inc., a subsidiary, is highly popular in the aircraft, rocket, automotive and appliance industries. The rocket body welder pictured here is working at Aerojet General, subsidiary of General Tire and Rubber Company.



AUTOMATIC FLASH REMOVAL SETUP for die-cast zinc carburetor parts. Two brushing heads—each made up of seven Osborn Master® Wheel brushes—are mounted over the conveyor. Parts (shown fixtured in lower left corner) pass under brushing heads where all flash is removed as they travel to next work station.

OUTPUT TRIPLED from 200 to 600 an hour with OSBORN power brushing

Before: this auto equipment maker was using costly off-hand methods to remove flash from these die-cast zinc carburetor parts. Production was slow . . . it varied from shift to shift, averaging about 200 pieces per hour.

Now: parts are Osborn power brushed clean as they travel between work stations by conveyor . . . *eliminating manual handling.* The setup of Osborn Master® Wheel brushes does the job at rates up to 600 pieces per hour . . . *three times as fast.* The operation is simple, inexpensive. Results are uniform, with excellent quality control.

This application is typical of how *your* tough metal finishing problems of every description—deburring, cleaning, polishing, precision blending—can be solved with today's Osborn power brushes and brushing methods. An **O**sborn **B**rushing **A**nalysis—made at no obligation in your plant now—is the first step. Write or call *The Osborn Manufacturing Company, Dept. S-36, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

(*Concluded from Page 73*)

Food Machinery & Chemical Corp., San Jose, Calif., will change its name to FMC Corp. on July 1.

Chemtron Corp., Phillipsburg, N. J., changed its name to Pearsall Chemical Corp.

Haloid Xerox Inc., Rochester, N. Y., changed its name to Xerox Corp.

CONSOLIDATIONS

National Screw & Mfg. Co., Cleveland, purchased controlling interest (51 per cent) in **Forges et Boulonneries Hermant Hicguet et d'Ars-sur-Moselle**, France. Industrial fastener manufacturing capacity of Hicguet plants at Hautmont and near Metz will be expanded, and the product line will be broadened considerably—with technical aid from National Screw.

Woodward Iron Co., Woodward, Ala., will acquire substantially all the net assets of **Lynchburg Foundry Co.**, Lynchburg, Va.

Gulton Industries Inc., Metuchen, N. J., acquired **West Instrument Corp.**, Chicago, producer of precision temperature control equipment.

Perfect Circle Corp., Hagerstown, Ind., is acquiring **Schellens True Corp.**, Ivoryton, Conn., producer of turbine blades and wheels, compressors, blowers, pumps, and auxiliary equipment.

Glidden Co., Cleveland, purchased **Magnetic Powders Inc.**, Johnsonburg, Pa., manufacturer of iron powders.

Air Reduction Co. Inc., New York, will acquire **Speer Carbon Co.**, St. Marys, Pa., subject to approval of Speer Carbon stockholders.

United Nuclear Corp., New York, acquired the assets and business of these organizations: **Nuclear Development Corp. of America**, White Plains, N. Y.; **Nuclear Fuels Operation** of Olin, New York; and **Nuclear Div.** of Mallinckrodt Chemical Works, St. Louis. United Nuclear established these units: Fuels

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SPECIALTY COLD ROLLED SPRING STEELS, WIRE AND TUBING
STEEL BELT CONVEYORS AND PROCESSING UNITS
COROMANT CARBIDE TOOLING
POWER SPRINGS
HAND SAWS AND TOOLS

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SWarthmore 7-6200 In N.Y.C. ALgonquin 5-2200

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ONtario 1-3205

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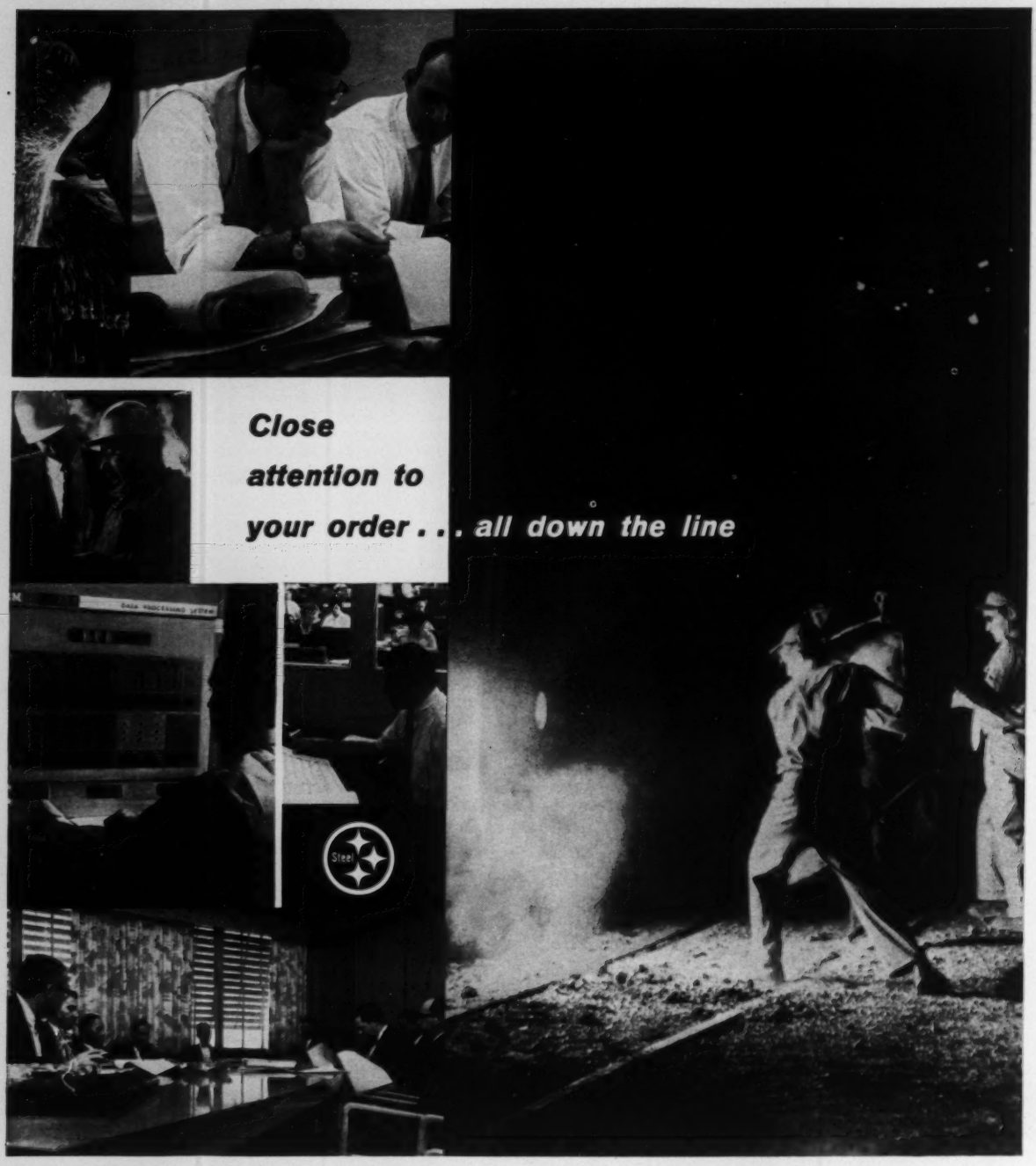
BRoadway 3-8474

SALES OFFICE
7520 North Long Ave., Skokie, Illinois
ORchard 6-2360

SALES OFFICE AND WAREHOUSE
3338 South Malt Ave., Los Angeles 22, California
RAymond 3-9116

SANDVIK STEEL, INC.
1702 Nevins Road, Fair Lawn, N. J. Works: Sandviken, Sweden

SS-216



Close attention to your order . . . all down the line

Alan Wood is just the right size to give your order and requirements the close attention of Alan Wood's skilled steel-men . . . all down the line. You get the advantage of young creative thinking tempered by 135 years of solid experience. Alan Wood's fully integrated operation cuts red tape, gives you uniform quality in plate, sheet and strip . . . consistently . . . and ON TIME.

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Conshohocken, Pa. • STEEL PRODUCERS WITH THE CUSTOMER IN MIND

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Div. under the direction of Edward Hartshorne, vice president; Development Div., under John R. Menke, vice president; and Chemicals Div., under Dr. Charles Harrington, vice president.

Air Products Inc., Allentown, Pa., acquired full control of its subsidiary, **Air Products Ltd.**, from Butterley Co., London, England. The British firm is principally involved in the design, manufacture, installation, and operation of oxygen plants and other cryogenic equipment. Air Products signed a 15 year contract with Shelton Iron & Steel Co. of Great Britain, calling for the design, construction, and operation of a large tonnage, high purity oxygen plant. The tonnage facility will be located adjacent to Shelton's works at Stoke-on-Trent, Staffordshire.

NEW PLANTS

Borg - Warner Corp., Chicago, formally dedicated the 300,000 sq ft plant and office building of its Atkins Saw Div. at Greenville, Miss. The division makes wood and metal cutting saws.

PDM Extrusion Die Co., Warren, Mich., is opening a plant at 1309 Bayshore, San Jose, Calif., for the production of extrusion dies. Facilities include those for welding, heat treating, and machining. A. R. Kadrovach is plant manager.

Foote Mineral Co., Philadelphia, is making commercial shipments from its butyl lithium plant at New Johnsonville, Tenn. The firm also announces that production of lithium ore at its Kings Mountain, N. C., mine has increased materially.

L-R Metal Treating Corp., Newark, N. J., opened a branch plant at 129 Stelton Rd., New Market, N. J. The plant is under the supervision of Henry Marshott.

Lely Ltd., newly formed Canadian firm and affiliate of C. Van Der Lely Co., Maasland, Netherlands, plans to build a $120,000 office and assembly plant contain-

(*Please turn to Page 82*)

HOW KAISER BENDS ALUMINUM CONDUIT ELBOWS...at low cost!

Low-cost volume forming of conduit elbows by the Kaiser Aluminum & Chemical Corporation at their Dolton, Illinois, plant has been important to their attainment of a leading position in the production of aluminum electrical conduit. Conduit and elbows are produced in 13 standard sizes ranging from ½" to 6" I.P.S. A single, versatile Pines Model 3 Bending Machine handles the ten standard conduit sizes from ½" to 4" . . . producing smooth 90° elbows with speed and accuracy.

The conduit elbows are bent without the use of mandrels, keeping tool costs low. Even without mandrels, there is no distortion of pre-threaded ends and flattening is held well within the limits set up by the Underwriters Laboratories Code. Production of smaller size elbows is increased up to 75% by bending two at a time on stacked tools.

Find out now how the speed and versatility of Pines Bending Machines can help you produce better quality products that cost less.

WRITE TODAY FOR COMPLETE CATALOG AND CASE STUDY REPORTS

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery

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This is AMERICAN OIL COMPANY

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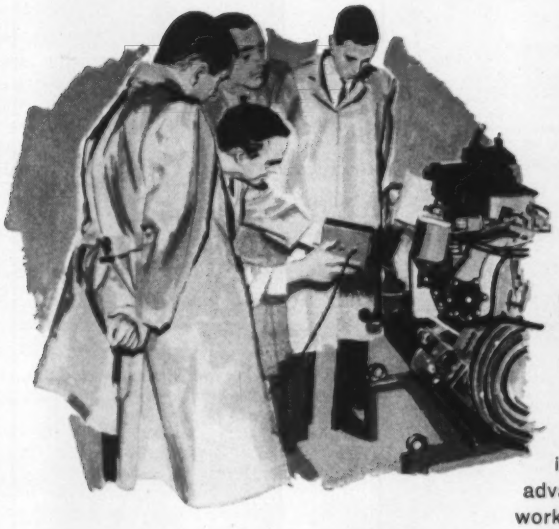
A sales organization especially trained to serve industrial and fleet customers . . . 74 District Offices and 13 Regional Offices . . . 4,100 warehouses and distribution points . . . 12 refineries . . . more than 2,000 products to serve you . . . this is American Oil Company.



The American Oil Company representative who calls on you receives special training in servicing industrial and fleet customers at our Sales Engineering School. His training begins with a concentrated course in petroleum product quality and application. According to a planned schedule, he returns for an advanced course and then again for post-graduate work. From our Marketing Technical Service Department, your American Oil representative draws assistance, when needed, from specialists who are recognized authorities in their fields. These specialists may be called in at any time to work with you on your lubrication problems. More than a thousand research scientists and technicians at our research laboratory support the effort of our representative to serve you. Their mission: To help your American Oil representative help you lower your maintenance costs and stretch your maintenance dollars. Learn more about American Oil, its men, its service, its products.

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TRANSACTER

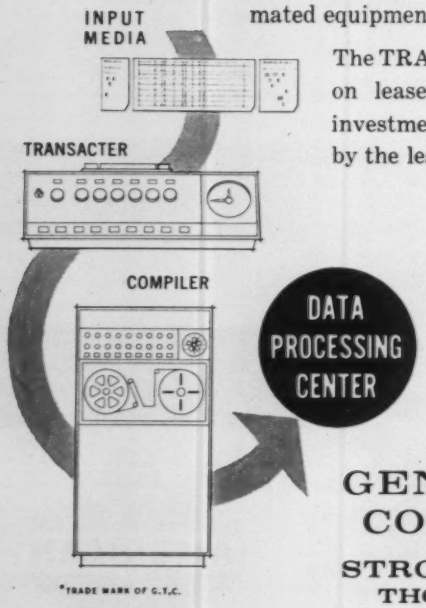
AT THE GARRETT CORPORATION
AiResearch Manufacturing Division

AiResearch, Phoenix announces an intensive modification program in manufacturing controls aimed at reducing production time. The heart of this program is continuous status reporting on every machine and part in production by the TRANSACTER* System.

Throughout the plant, the TRANSACTERS provide an incredibly accurate, instantaneous link between widely scattered factory locations and central data Compilers which receive the messages, digest them and feed continuous punched tape to the data processing nerve center.

Not only is production status continuously reported—so too, is order location, inventory control, tool crib and stores control—all contributing to accurate labor costing—together with continuous reports of receipt and shipment. These are a few of the many potential assignments for the TRANSACTER System.

At AiResearch, Phoenix management reports that have heretofore taken days, can now be produced in minutes by the completely automated equipment.



The TRANSACTER System, installed on lease, thus requiring no capital investment, is continuously serviced by the lessor.

Write for informative brochure. If you prefer, a qualified representative will call.

GENERAL TIME CORPORATION
STROMBERG DIVISION
THOMASTON 4, CONN.

*TRADE MARK OF G.T.C.

MAKERS OF THE WORLD'S FINEST TIME EQUIPMENT

(*Concluded from Page 79*)

ing 20,000 sq ft near Oakville, Ont. The firm will eventually manufacture its line of farm machinery at the new site.

ASSOCIATIONS

C. W. Rush Jr., Beaton & Corbin Mfg. Co., Southington, Conn., has been named first vice president, **Plumbing Brass Institute**, Pittsburgh. Norman Lougee, Chicago Faucet Co., Chicago, was named second vice president, and E. O. Harbeck, Michigan Brass Co., Grand Haven, Mich., treasurer.

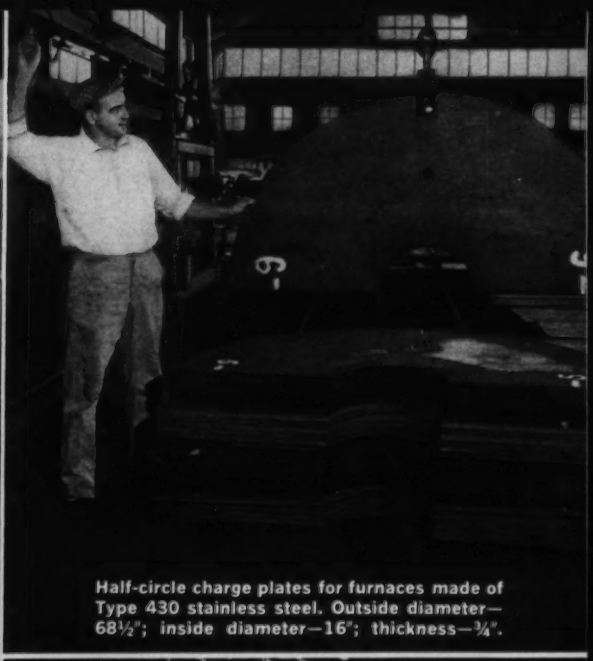
Systems & Procedures Association of America, Detroit, elected these officers: President, W. J. Bates, Commercial Dept., U. S. Steel Corp., Pittsburgh; executive vice president, C. W. Schreiber, Organic Chemicals Div., Bound Brook, N. J., American Cyanamid Co.; secretary, W. E. Rohde, Ideal Cement Co., Denver; and treasurer, Arthur Weiss, Altschuler, Melvois & Glasser, Chicago.

Institute of Appliance Manufacturers, Washington, elected these officers: President, Sol Goldin, Whirlpool Corp., St. Joseph, Mich.; executive vice president, A. B. Ritzenthaler, Tappan Stove Co., Mansfield, Ohio; secretary, E. C. Sorby, Geo. D. Roper Corp., Chicago; and treasurer, S. B. Rymer Jr., Magic Chef Inc., Cleveland.

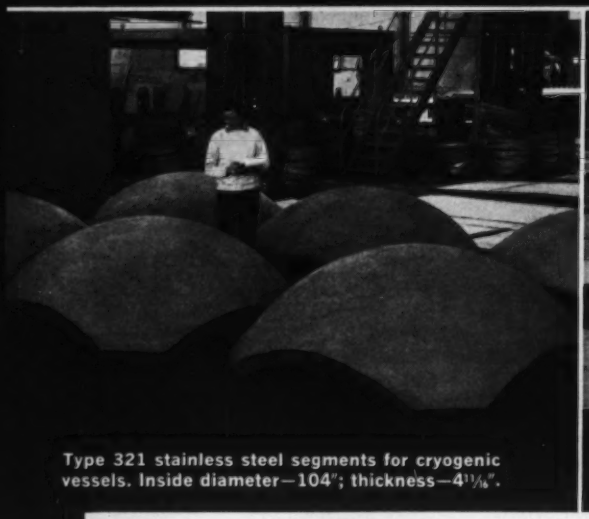
Canadian Institute of Steel Construction Inc., Toronto, Ont., elected these officers: President, E. A. Ford, Dominion Bridge Co. Ltd., Montreal, Que.; first vice president, W. J. H. Disher, Bridge & Tank Co. of Canada Ltd., Hamilton, Ont.; second vice president, F. R. Murray, Truscon Steel Co. of Canada Ltd., Walkerville, Ont.; third vice president, A. Joedicke, London Steel Construction Co. Ltd., London, Ont.; and honorary treasurer, P. E. Savage, Dominion Bridge Co. Ltd.

Machinery Dealers National Association, Washington, elected these officers: President, Alex Zeeve Jr., Alex Zeeve & Co. Inc., New York; first vice president, B. A. Small,

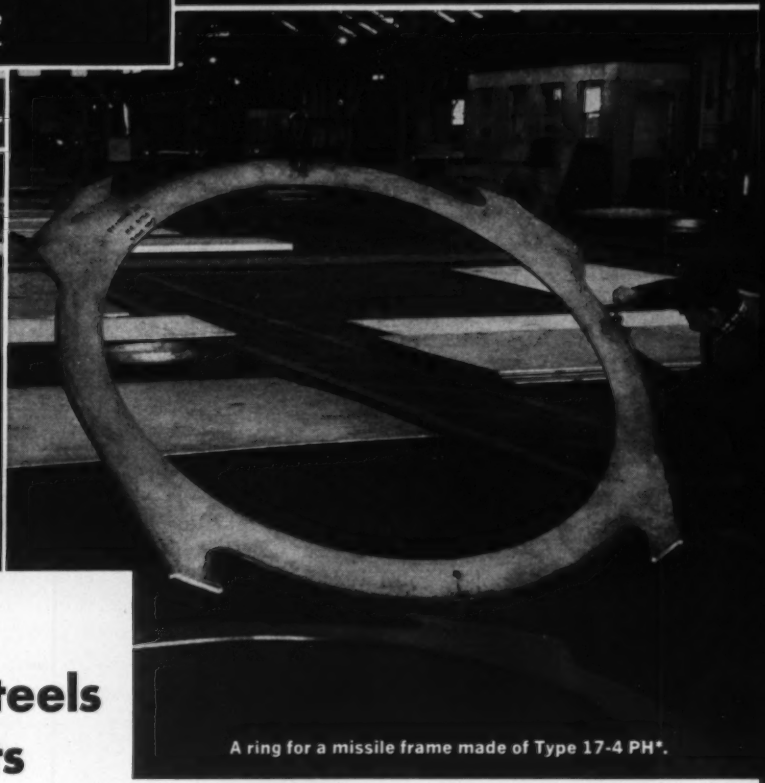
Indexing plate for nuclear storage cask. Type 304. Outside diameter—44⅛"; thickness—2¾".



Half-circle charge plates for furnaces made of Type 430 stainless steel. Outside diameter—68½"; inside diameter—16"; thickness—¾".



Type 321 stainless steel segments for cryogenic vessels. Inside diameter—104"; thickness—4$^{11}/_{16}$".



A ring for a missile frame made of Type 17-4 PH*.

special shapes special stainless steels for special projects

Producing stainless steel plate, plate products, and forgings is our business. Orders often call for unusual shapes in stainless plate, shapes that will become important components in special projects. Whatever the requirement, your confidence in Carlson specialists is well placed.

A Carlson booklet, "Producing Stainless Steels . . . Exclusively," is now available. Why not write for your personal copy today?

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For top efficiency in tank cleaning

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OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS

First choice in heavy-duty tank cleaning—hard-working Oakite "24"

Users everywhere agree that their best way to clean iron and steel parts is to tank-soak them in a hot solution of heavy-duty Oakite 24. This hard-working alkaline cleaner gets under the dirt layers and literally tears the soil from the surface. Despite excessive soil contamination of solution Oakite 24 maintains proper pH level and provides long, effective cleaning action.

Oakite 24 is but one of a wide range of alkaline tank-cleaning compounds. Others include medium and light duty oil and grease removers; self-emulsifying solvent cleaners specially designed for removing buffing compound residues, pigmented drawing compounds and other tenacious burned-on solid-particle dirts and smuts. Also available is a useful selection of materials for cleaning brass, copper, aluminum, magnesium, lead, tin and zinc.

Which is best for you? Only you and the Oakite man together can decide. It depends on your equipment, the parts you process, the next production step. Ask the Oakite man. From over 30 materials, you're *sure* to get the one cleaner that works most efficiently for you. Write for Bulletins. Oakite Products, Inc., 34G Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

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years' leadership in industrial cleaning

MacDell Corp., Chicago; second vice president, J. M. O'Connell Jr., O'Connell Machinery Co. Inc., Buffalo; and treasurer, R. J. Strom, Strom Machinery Corp., Hammond, Ind.

Bailey I. Ozer, Viking Copper Tube Co., Cleveland, has been elected vice president of the **Copper & Brass Research Association**, New York.

NEW ADDRESSES

Accurate Wire Forming Inc. moved to 2050 N. Janice Ave., Melrose Park, Ill.

Phoenix Steel Corp., New York, moved its district sales office to 3 Parkway Center, 875 Greentree Rd., Pittsburgh 20, Pa. Frank E. Pray is district sales manager.

National Automatic Tool Co., Richmond, Ind., moved its regional sales office to 22649 Lorain Rd., Cleveland 26, Ohio. L. C. Thery is in charge of the office.

NEW OFFICES

Budd Electronics Div., Long Island City, N. Y., **Budd Co.**, opened a regional office of its Government Relations Dept. at 1000 Connecticut Ave. N.W., Washington 6, D. C. Dean O. Morgan is regional manager.

Carmet Div., Ferndale, Mich., **Allegheny Ludlum Steel Corp.**, established a Pacific District office at 2435 W. Beverly Blvd., Montebello, Calif. C. L. Bohrer is district manager.

Van Huffel Tube Corp., Warren, Ohio, established a district sales office at 5400 Milwaukee Ave., Chicago 30, Ill. Kenneth C. Abbott is district manager. The firm makes metal tubing and rolled steel sections.

CompuDyne Corp., Hatboro, Pa., opened a branch office at 1148 Englewood Ave., Englewood, Calif. The company makes computer operated, automatic control systems.

Working proof of Superior stainless quality—*the year around*

Superior

STAINLESS STRIP STEEL

Out front, and ever-bright—looking its best when the weather is worst—Superior Stainless in the millions of windshield wiper assemblies on today's cars speaks for *enduring quality*. The stainless strip is made right to behave right—uniform as can be, from coil to coil. • There's a Superior grade to meet *your* application in every particular. Write.

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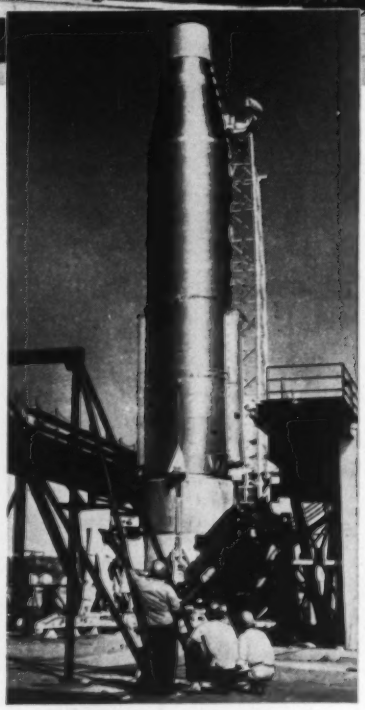
For Export: Copperweld Steel International Company, New York

Stainless Steel

CONVAIR ERECTOR-LAUNCHERS RELY ON POWERFUL PHILADELPHIA GEAR DRIVES

Atlas ICBM in stored position. Arrow points to heavy duty Philadelphia Gear hoist drive, which quickly erects missile to launch position for skyward voyage. Erector-launcher designed and built by Convair (Astronautics) Division of General Dynamics Corporation.



Atlas can now lie low till needed . . .
new hoisting mechanism eliminates massive gantry towers

The Air Force has equipped itself with a new missile hoist mechanism which is both speedy and powerful. These two requirements plus ultra-reliability have qualified Philadelphia Gear Drives for the moments-notice job of erecting Atlas to launch position. The "Big Punch" is now stored horizontally. These erector-launchers are now operational at Atlas ICBM complexes at Warren Air Force Base, Wyoming.

The Philadelphia Gear Drive is a standard, all-steel, parallel shaft reducer. Output torque is 634,000 lb/inches at 7½ rpm, on low speed shaft; 1,250,000 lb/inches under emergency conditions; ratio—234:1. All units are load tested to 300% of normal rating.

Standard Philadelphia heavy-duty drives are right at home in any application that demands an extra margin of reliability. Our engineering specialists in all kinds of power transmission problems have made sure Philadelphia Gear equipment has more than kept the pace to help America keep the peace. To see what can be done in gearing today, write for our catalog "Philadelphia Parallel Shaft Speed Reducers," No. H-58.

AGMA
MEMBER

philadelphia gear drives

PHILADELPHIA GEAR CORPORATION
King of Prussia (Suburban Philadelphia), Pennsylvania

ROLL NEEDS CITED—Progressive roll forming machines, especially those that produce welded pipe, are already faster than the equipment which handles the finished product, a major machine builder tells STEEL. If cutoffs and mechanical equipment can be built to match, welded pipe in large sizes could be made at several hundred feet a minute with ease.

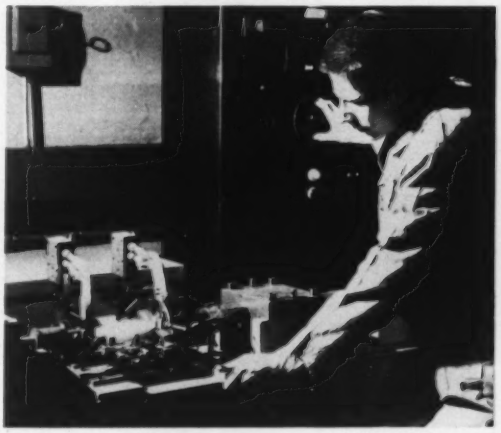
TRAIN MORE WELDING ENGINEERS—The British, alarmed by welding advances here and in Russia, have established a one year postgraduate course for engineers at Cranfield College of Aeronautics. This country has six universities where welding engineering training is available. By contrast, Russia annually graduates 400 students with welding engineering degrees, says *Welding & Metal Fabrication.*

FORGING ADVANCES—"Few people either in or out of forging adequately recognize the tremendous importance of modern mechanical presses in the production of forgings." That's the opinion of Dwight Allgood, executive vice president of the Drop Forging Association, Cleveland, who pointed out to STEEL that such equipment is a key to fast automated systems.

CONTINUOUSLY CAST BLOOMS—The new Weybridge process enables the British to cast billets and bloom sections continuously at rates comparable to those on multistrand machines but without the additional operating expenses normally associated with them. It employs a multiple mold which casts several billets simultaneously which are interconnected at the corners. The billets are easily separated after casting, says the British Iron & Steel Research Association, London.

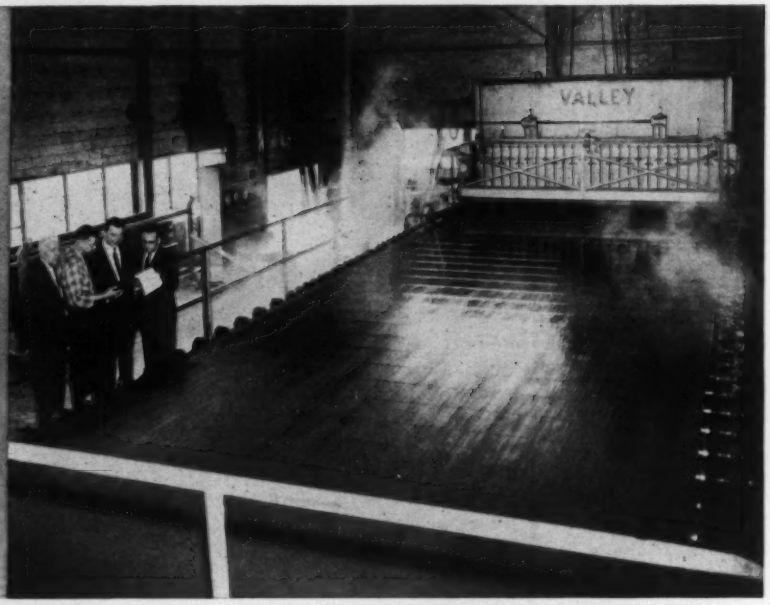
CEMENT RESISTS HEAT—A ceramic adhesive called Astroceram resists heat so successfully that aluminum components can be melted completely without disturbing the adhesive, states American Thermocatalytic Corp., Mineola, N. Y. Tensile strengths are 10,000 to 15,000 psi, compressive strengths 80,000 to 150,000 psi. Composition is proprietary but at least some parts contain oxides or silicates of Group IV elements. The cement is soluble in hydrofluoric acid, slowly soluble in boiling sulfuric acid and insoluble in hydrochloric, nitric, phosphoric, and sulfuric acids at room temperatures.

NEW ELECTROFORMING ENTRY—Latest entry in the electrochemical machining field is a process developed by General Electric Co., Schenectady, N. Y., which has licensed Hanson-Van Winkle-Munning Co., Matawan, N. J. General Electric says its process can be employed with all metals to achieve exceptionally close tolerances. Jet engine parts are being shaped with the process.



FAST HOT TESTER—This very short time (VST) simulator reproduces a combination of sudden, intense heat and the violent pushing, pulling, and twisting that occurs in aircraft and space vehicles, says Battelle Memorial Institute, Columbus, Ohio. It is particularly helpful in studying short term strength built into metals through cold working or special heat treatments.

PHOSPHOR BRONZE CORE WIRE, surrounded by six stainless wires, after drawing to finish size



Wire shown in cross section supports this paper pulp layer . . .

Composite Stainless Wire Withstands Flexing Damage

• A COMPOSITE WIRE combines the corrosion resistance of stainless steel with improved flex resistance. In its first major application (moving wire screens used in papermaking), a significant increase in service life was realized.

Made by a special drawing process, the wire has a core of phosphor bronze and an outer surface of Type 304 stainless steel.

The wire is drawn by Fort Wayne Metals Inc., Ft. Wayne, Ind. The woven mesh is made from the wire by W. S. Tyler Co., Cleveland. In weaving, the wire is combined with solid stainless steel strands.

• The composite structure starts with several strands of wire.

To achieve the combination, Fort Wayne Metals starts with a complex of six stainless steel strands around a phosphor bronze core. The structure looks like rope when it is examined under low power magnification.

The combined strands are drawn through diamond dies, with repeated anneals, to final size—less than 0.010 in. Tensile strength in the 0.0045 in. diameter range is 103,500 psi.

No flux is used in the drawing and annealing steps. But in processing, the softer metal core bleeds into the interstices of the combined wire, forming an integrated bond. The completed wire has a stainless steel surface, and its corrosion resistance apparently is similar to that of the stainless used.

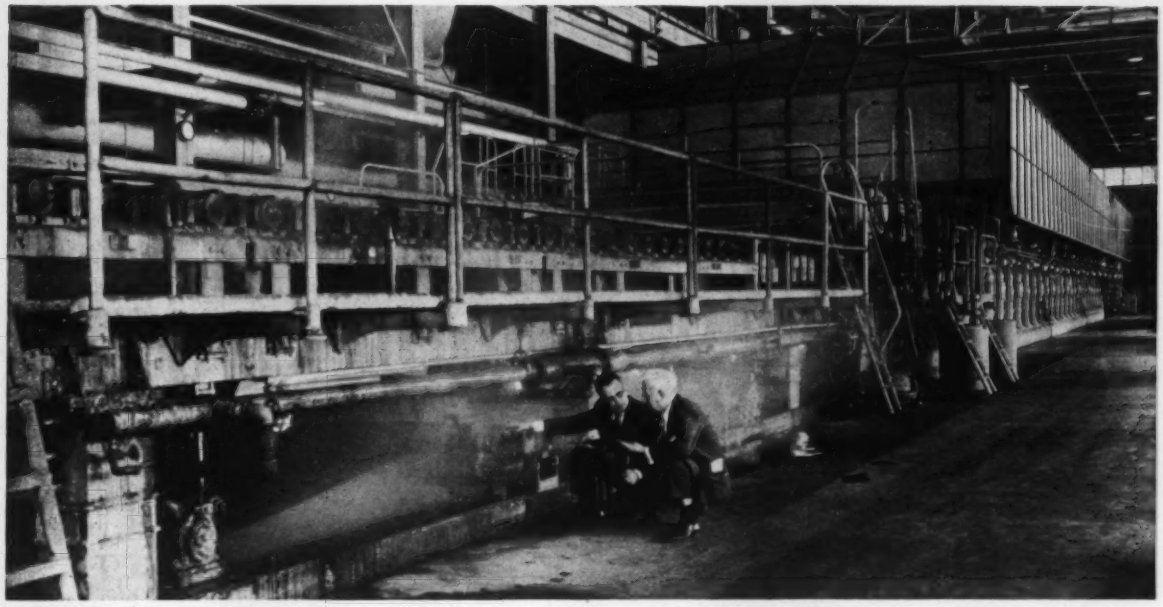
• In weaving the mesh, the wire is combined with solid stainless.

Some 20 years ago, stainless steel was tried for the screens used in papermaking machinery. It stood up well under the corrosive environment, but the longitudinal wires—called warp wires—broke, due to flexing as they passed around the end rolls of the machine. The new product, which withstands flexing well, is used as the warp wires in the stainless mesh. The crosswires—called shute wires—are solid stainless steel. They do not flex because they are parallel to the axis of the rolls.

• Papermaking plants use miles of fine mesh screening.

Most paper is made on Fourdrinier machines. The process, developed in France about 160 years ago, requires a belt of wire screening. Modern machines may be more than a city block long, and the screen belt may be worth more than $1000. The screen mesh, made on wide looms, has openings about a quarter the size of window screening. The belt passes over a system of rollers and idler wheels which provide support and keep it in motion. From a header box, the slurry (paper pulp, water, and various chemicals) is fed onto the moving belt. Thickness and uniformity of the paper depend on the feed conditions.

The water solution, or "liquor," passes through the belts, aided by suction. At the delivery end, the



It cuts downtime in this Fourdrinier machine, because . . .

paper stock is picked up on blotting felts and further processed over steam heated rolls. The belts (called wires) are operated continuously at speeds as high as 3000 ft per minute.

• Service life of the mesh is an important cost item.

Downtime required to replace belts on a large Fourdrinier machine may amount to $1000 per hour. Service life of the screens will vary with the nature of the "furnish" mixture applied to the belt. They may last less than a week under severe conditions. A belt change may take 4 hours.

While the belts are substantial cost items, downtime may be even more substantial.

• The wire has shown improved service life in plant tests.

Work on the wire was started in 1957 by Ardelle Glaze, president of Fort Wayne Metals. The warp strand was developed in co-operation with W. S. Tyler. The belt, called Ty-Flex, was first used by the Filer City, Mich., plant of Packaging Corp. of America. John Ham, superintendent of the corrugating paper operation, one of the nation's largest, reports that the product lasts a minimum of four times as long as wires made of other materials. The plant's present belt has run more than 70 days, he notes.

The two huge Fourdriniers at the Filer City plant run 24 hours per day and turn out about 11,000 tons of corrugating media per month. The plant has 7 to 15 fewer shutdowns per month, representing a monthly cost reduction of $14,000 to $30,000.

Other paper mills have reported similar savings. W. S. Tyler says that Mead Corp., Container Corp. of America, and the Waldorf Paper Co. have experienced similar savings. Wire cost has been cut as much as 66 per cent, and service life has been as high as 102 days.

Principal uses are in corrugating and structural paper production. Prototype wires are being tried in runs on other types of paper, the producers state, but results are not yet available.

• Other suppliers may offer the product.

Tyler-Wayne Research Corp., Cleveland, has been formed to administer licenses under the basic patents. One license arrangement has been made, the company reports, and others are being negotiated. The wire also may be produced in other countries. The company is developing a foreign patent position.

Other functions of Tyler-Wayne include research and development in specialty wires and their applications. The company expects that the new wire will have other uses in aircraft, missile, marine, and industrial fields because of its combination of the strength, wear, and corrosion resistance of stainless steel with the flexibility and resistance to fatigue of the nonferrous metals.

• The product may compete with other materials.

The corrosion problem has caused papermakers to look at plastic filaments and other metals. Alfred E. Reed, vice president of W. S. Tyler and secretary-treasurer of Tyler-Wayne, believes the new product will offer substantial advantages. One point of superiority: It resists stretching. The length of the belts in the Fourdrinier machines means that a stretch of 5 per cent may amount to 5 ft, Mr. Reed notes.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

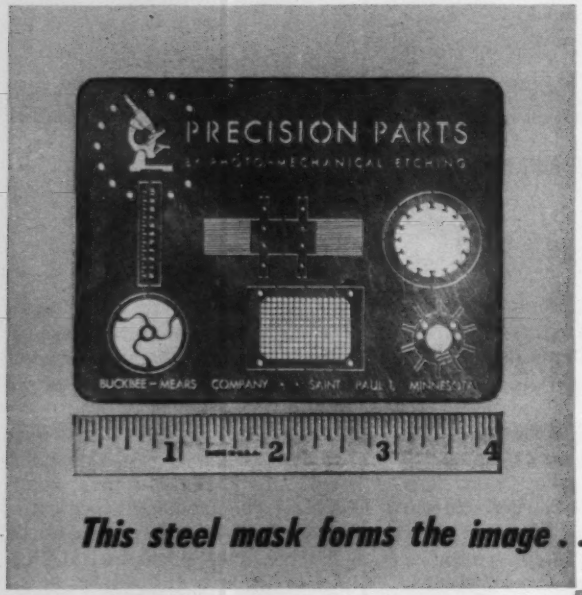
X-ray Takes a Turn for the Brighter

LOOKING for defects with an x-ray fluoroscope is much easier than it used to be, thanks to an electroluminescent screen developed for Army Ordnance by RCA's Electronic Tube Div., Harrison, N. J.

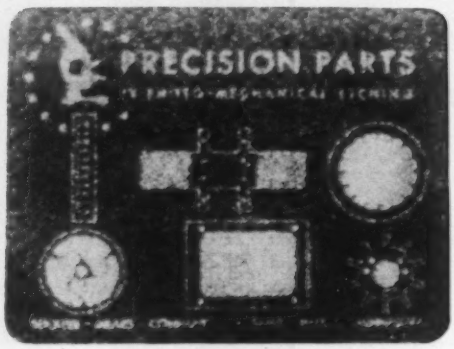
Called a solid state image intensifier, the device is perhaps 100 times more sensitive than ordinary fluoroscope screens, says RCA. It permits nondestructive testing of products while they are being made at a remote location. The screen can be viewed in ordinary daylight.

The combination of x-rays and the new screen facilitates detection of flaws in castings, forgings, weldments, and honeycomb panels. It also has medical or other nondestructive applications. (RCA is studying the markets.)

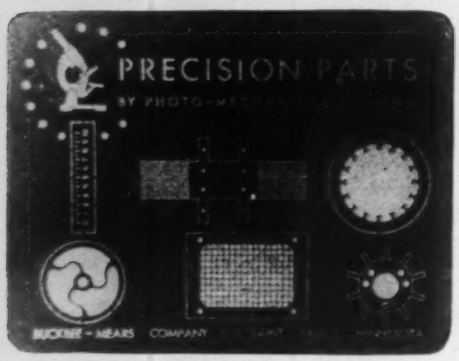
• David K. Wilburn, who worked with the device at Army's Detroit Arsenal, says the screens work best at low energy—150 to 500 kv. They can be employed for quick general

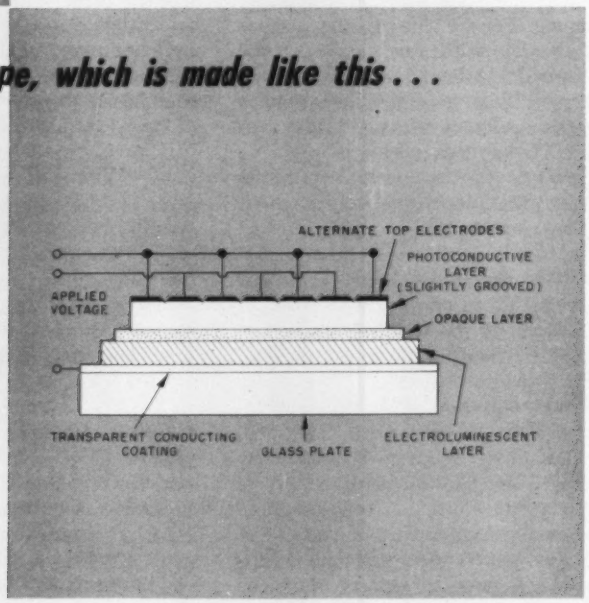


This steel mask forms the image . . . on ordinary x-ray intensifier



Definition improves on RCA's latest type, which is made like this . . .





survey work under any light conditions.

A fluorescent panel sandwiched between thin, electrically conductive layers (see illustration) serves as an image intensifier in x-ray fluoroscopes.

The intensifier converts an x-ray pattern into a visible picture more efficiently than regular screens. The picture on the new device is 100 times brighter than that of a Patterson CB-2 screen (a recognized standard).

The photographs (opposite) illustrate the degree of clarity achieved by the new panel.

Any further improvement in brightness (or gain), says Mr. Wilburn, must be made in the coating or photoconductive material. Cadmium selenide is better but it requires more development to make it practical, says RCA.

• Panels are made by spraying cadmium sulfide over a transparent conductor layer on glass.

Spraying reduces a marked graininess which was experienced with other application methods.

The back electrode can be formed on top of the cadmium sulfide layer mechanically, or by evaporating a metallic pattern through a mask made of parallel wires wound on a rectangular frame.

• The x-ray image formed on the image intensifier screen persists for many seconds after the x-rays are turned off.

The slow reaction speed of the cadmium sulfide employed in the fluorescent coating is responsible. That's fine if you want to examine the image for awhile. Otherwise, production is slowed until the image decays.

The developers have approached the erasing problem two ways: Electronic erasing and improved photoconductors.

Electronic erasure is accomplished by separating the back (or top) electrode into some 80 lines an inch. Simply reversing the polarity of the voltages applied to front and back electrodes erases the image.

In fluoroscopy, a luminous screen of fluorescent panel (like that on a TV picture tube) is employed to show the pattern of x-rays passing through an object. In regular x-ray, the pattern is photographed.

Hardening Process Keeps Tools Bright

• AN AUTOMATIC hardening process for high speed tool steels that produces a bright part finish has been developed by Ipsen Industries Inc., Rockford, Ill.

The process maintains correct surface carbon concentration, holds distortion to a minimum, and reduces the cost of operation to less than one-half that of a salt treatment, declares H. N. Ipsen, president.

• The basic equipment used in the treatment is a modified, Ipsen, vacuum heat treating furnace.

The work is protected from oxygen and other oxide producers during the entire heat treat cycle. It means, says Mr. Ipsen, that parts often can be finished prior to heat treatment since no surface decarb will have to be removed. Also, since both work and the furnace are heated together and the parts are not moved while hot, distortion is minimized.

• Any type high speed or tool steel can be hardened in the unit, says Perry Glenn, chief metallurgist.

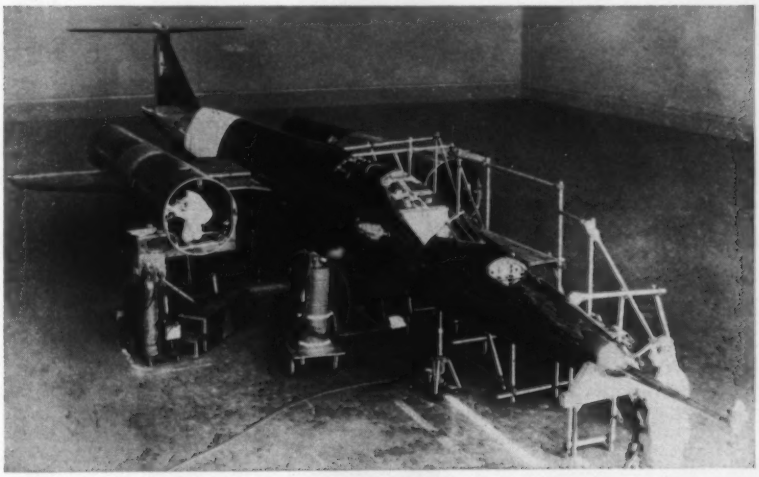
By setting an automatic cycle on the furnace, you take the skill out of heat treating the high speed steels. To operate the unit, the work is placed in a basket on a charging platform. The operator manually opens the furnace door, swings the loading platform into position in front of the unit, and rolls the work basket into the furnace.

Special ceramic rollers inside the furnace support the load during the heating and cooling cycles. After the door is sealed, the operator sets the time at preheat soak and the time at high heat soak. The unit will do all functions automatically, and upon completion of the last cycle, a bell rings.

Cooling of the work is done within the vacuum furnace by forcing gas into the chamber.

The vacuum heat treating unit is completely cooled and can be placed, ideally, in an air-conditioned room. There are no fumes. Special pretreatment of the material, other than normal cleaning, is not required.

Ipsen is doing sample and commercial work in the vacuum unit at Ipsenlab of Rockford Inc.



Stainless Supersonic Plane Shown

THE BRISTOL T-188 is the latest "flying missile." It's being readied for advanced study of the problems of multisonic commercial aircraft of tomorrow, states American Iron & Steel Institute, New York. It's constructed largely of stainless to resist operational temperature increases at Mach 3 plus. Type 403 is employed in many skin sections.

New Technique Buffs Beauty On Stainless Strip

● ***Five station line handles strip at 20 to 80 fpm***

REFINEMENT of production line buffing techniques has enabled Universal-Cyclops Steel Corp., Bridgeville, Pa., to market a new, highly reflective, finished stainless steel strip.

The finish, called Unibrite, is U-C's answer to the bright annealing process recently adopted by several stainless strip producers. Officials claim that the new process results in a brighter, more corrosion resistant strip. It was developed primarily to help reduce finishing costs in automotive, appliance, and houseware applications.

Key to the process is a new, Hill Acme five station, buffing line installed at the company's stainless strip mill in Coshocton, Ohio. The line takes up to 18,000 lb coils up to 26½ in. wide. The strip is buffed on both sides at speeds ranging from 20 to 80 ft per minute. Although speeds and compounds used are proprietary, the company says metal is actually removed from the strip surface in the process.

"Production experience and reports from customers convince us that in-line buffing is the best method for improving corrosion resistance and obtaining consistency of finish, color, and shade from coil to coil," relates William G. Stewart, president. "The bright annealing process can only retain the reflectivity imparted by the cold rolling."

Many fabricators who have tried Unibrite have reported side benefits of improved cold workability and cleaner roll forming, says U-C.

'Water Soluble' Acts Like Straight Oil

A COMPOUND called Vantrol 700 may make it easier to replace oils with a water soluble type in metal cutting operations, says Van Straaten Chemical Co., Chicago.

Reason: "The lubricating elements in the compound are adsorbed on the work and tool surfaces, enabling it to perform better than straight oil," states the developer, Dr. George E. Barker, vice president and director of research for Van Straaten.

• **Cites Case Histories**—An automobile manufacturer formerly employed a straight oil in broaching wrist pin holes in connecting rods. Production was 2000 parts per broach.

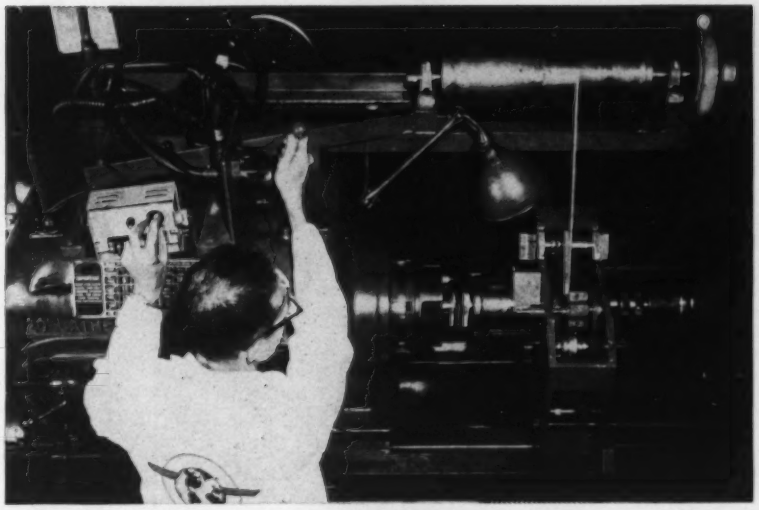
By substituting Vantrol 700, production was increased to 5000 pieces per broach. Finish has been improved, and the amount of resharpening has been halved. Also, the new water soluble oil isn't contaminated by the residue of straight oil formerly employed.

In a second case, a manufacturer of jet parts drilled, chamfered, and reamed Stellite 21 alloy parts with carbide tools in a straight oil. Switching to the new water soluble oil increased production from 70 pieces per tool to 370. Smoke and oil vapors were eliminated.

In form grinding Type 403 stainless jet blades, another firm increased output per wheel dressing from 8 to 40 pieces. The operation was reduced from four to two grinding passes; time was cut from 18 to 15 seconds.

In broaching both ends of a connecting rod, a farm equipment manufacturer pushed production to 450 pieces from 100 before resharpening tools by employing the water soluble oil.

• **Describes Physical Properties**—Vantrol is a semiopaque emulsion that permits a machine operator to obtain the cooling effects of water and still retain some of the performance characteristics of a straight oil. It mixes readily in hard or soft water, resists spoiling, inhibits rust under normal conditions, and lasts a long time, states Van Straaten.



Subscale fabrication shows feasibility . . .

Stronger Pressure Vessels Made by Tape Wrap Method

• PRODUCTION of pressure vessels may be revolutionized by a process that's being used in the development of superstrength cases for solid fuel rocket motors. The technique—titanium tape wrapping on a removable mandrel—is being employed at Wright Aeronautical Div., Wood-Ridge, N. J., of Curtiss-Wright Corp.

The program: To develop contoured, interlocking wire of high strength, titanium alloy and to use it in making subscale vessels.

• Small scale cylinders indicate process feasibility in design, metallurgy, and fabrication.

I-beam and channel section tapes are fabricated from commercially available weld wire. The wire is broken down in power driven rolls and finished in turk's-head rolls. Final tensile strength of 250,000 to 300,000 psi is obtained by aging at 700 to 750° F for 12 to 25 hours.

The vessels are tape wrapped on a converted lathe. The wrapping apparatus includes a frame that supports three, equally spaced rollers, which apply up to 2500 lb radial force to the tape. The collapsible mandrel is removed after the wrapping is completed; then the vessel is sealed against leakage with a vinyl coating.

If the process can be scaled up successfully, the full size vessel will have a strength-to-density ratio of 170 million in., based on full utilization of B-120VCA, cold reduced and heat treated tape.

• High tensile strength of severely cold reduced metals is exploited by spiraled, interlocked windings.

Each turn of the tape is locked into the preceding one. Shape and proportions of the tape cross sections are chosen to give the final cylinder the right amount of hoop-to-axial strength and to take full advantage of the tape's longitudinal and transverse strengths.

Structural integrity of the vessel depends on proper interference fit between the tapes. That fit is governed by the accuracy with which the tape can be made, the coefficient of static friction, mechanical properties of the material used, and the forces employed in assembling the vessel.

Electrode under moving seam prevents tungsten contamination . . .

Inclusions Are Eliminated In Upside-Down Welding

• UPSIDE-DOWN welding may help eliminate unwanted inclusions in many fabricating areas, as it has in the production of stainless steel, titanium, and zirconium tubing for nuclear use. The work is being done at the East Troy (Wis.) plant of Trent Tube Co., a subsidiary of Crucible Steel Co. of America.

"We are doing research on the mechanism of tungsten transfer and means of controlling it," says Harold Bowman, director of research and development at Trent Tube. "The inclusions are objectionable in tubing for nuclear applications, and our tubemaking process insures inclusionfree welds. But our studies are being continued, primarily for the benefit of customers who will be welding the materials."

• Welding with the electrode under the work prevents inclusions because the contaminating tungsten flows downward.

Preliminary studies offer a logical explanation of tungsten transfer in the inert arc welding process. Metal or oxide is picked up from the work by the tungsten electrodes. The transferred material builds upon the electrode, melts, and flows downward, carrying molten tungsten (from the electrode) into the liquid portion of the weld.

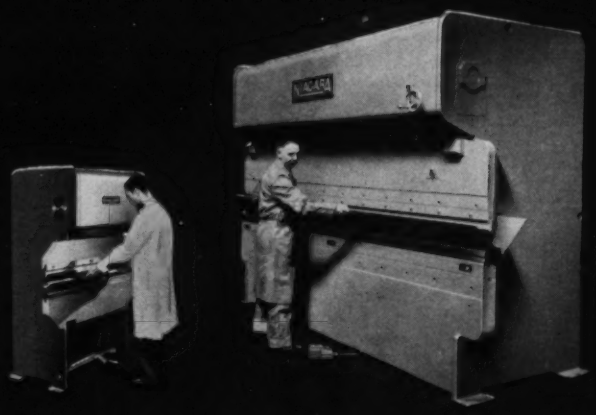
Transfer seems to be accelerated by oxide film, which is responsible for the passivity of stainless steel and titanium in the arc.

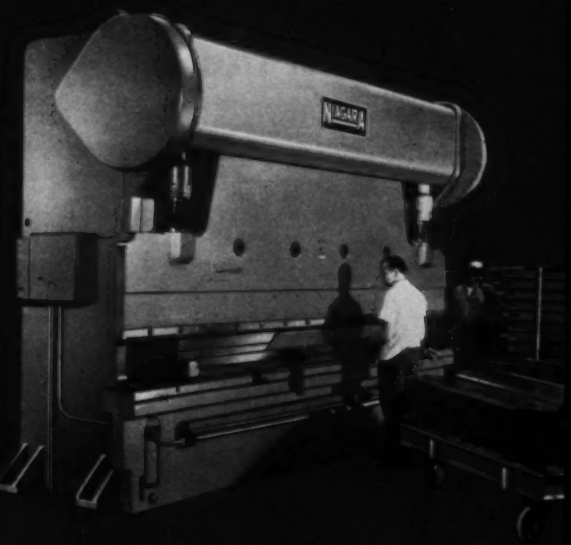
• The tube welding process was perfected to eliminate bulges on the inner surface of the tubing.

In the contour welding process, which is used in tubemaking at the plant, the electrode is positioned beneath the formed tube. Gravity causes molten metal to run downward.

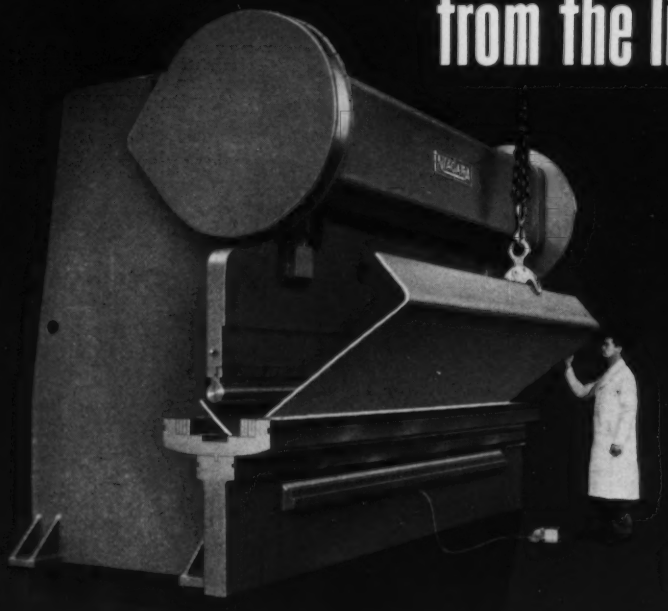
The process leaves no bulge of weld metal on the inner surface of the tube. On the outside, the weld contour closely approximates that of the parent metal.

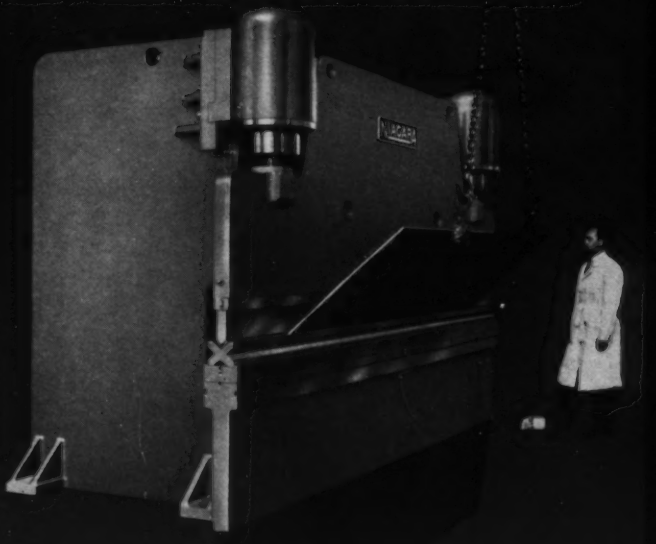
In conventional welding processes, gravity causes some of the molten metal to flow into the tube. That causes formation of a bead that's difficult to remove by cold working, especially in heavier gages. In some cases, the bead, or flash, is trimmed from the inside and outside of the tube immediately after welding.





MAKE THE RIGHT DECISION
from the line that means the most





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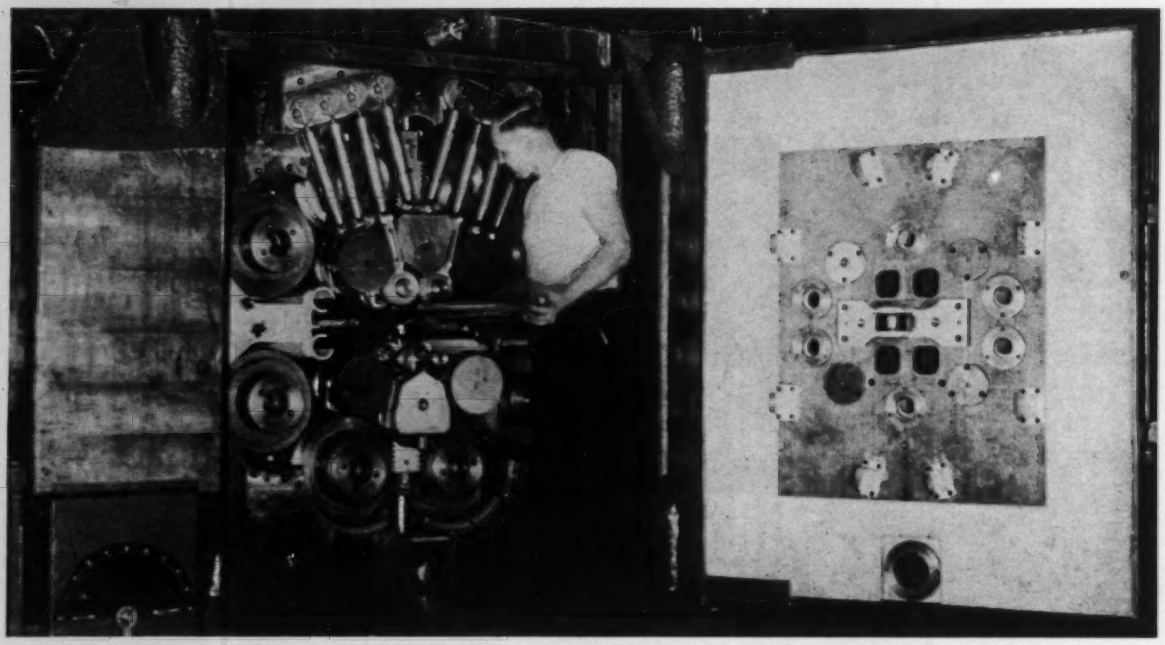

Specialty process shifts into high production area . . .

Sendzimir Mills Tuned Up To Roll Thin Tin Plate

• "THIN TIN PLATE with excellent surface quality and close gage tolerances can be made at competitive prices in processes that employ the Sendzimir cold reducing mill."

Quoted is James F. Fox, field sales manager, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., a division of Textron Inc., who adds:

The Sendzimir mill can be used to advantage for reducing steel from the hot strip mill to final gage, in several passes, or it can be used for final reduction of strip from a five stand, tandem mill."

Low carbon steel strip of the type used to make tin plate has been rolled satisfactorily on the Sendzimir mills during tests. Reduction per pass was enough to insure commercial feasibility.

• Superior surface quality is made possible by frequent roll changes; small work rolls make for rapid reduction.

Good surface isn't a problem with the mills. Work rolls can be changed at any time, with minimum rolling delay. Small diameter rolls make regrinding relatively inexpensive, and eliminate the need for a heavy crane during roll changes. Quick roll changes also make it possible to roll strip of different widths and finishes at random, with minimum downtime for job changes.

Tungsten carbide work rolls are often used on the mills to maintain superior surface on long production runs. Importance of surface quality is emphasized in the production of rerolled tin plate—where the strip is given a final pass after tinning, to produce an ultrathin product.

The work rolls are said to be subject to less flattening because of their small bite on the strip. Result: They continue to reduce the metal after it has become thin—and work hardened.

The mills are capable of making reductions up to 50 per cent per pass.

• Flatness, crown, and gage of the strip are closely controlled by the rigid system of backup rolls and bearings.

The backup bearings are built in segments. Each segment is mounted on an eccentric ring. Rotation of the eccentric changes the pressure applied by that bearing on the roll cluster. Individual adjustment of the bearings across the strip width permits the operator to change the shape of the roll opening to correct strip shape or crown.

Flatness of the rolled product is said to match that of the incoming material, unless the roll pass is altered to reduce crown and give the strip more uniform thickness. But flatness is usually given priority in tinned material; full shape or herringbone can make for difficult lithographing on can stock.

Lateral adjustment of intermediate mill rolls makes it possible to roll strip of several widths, shapes,

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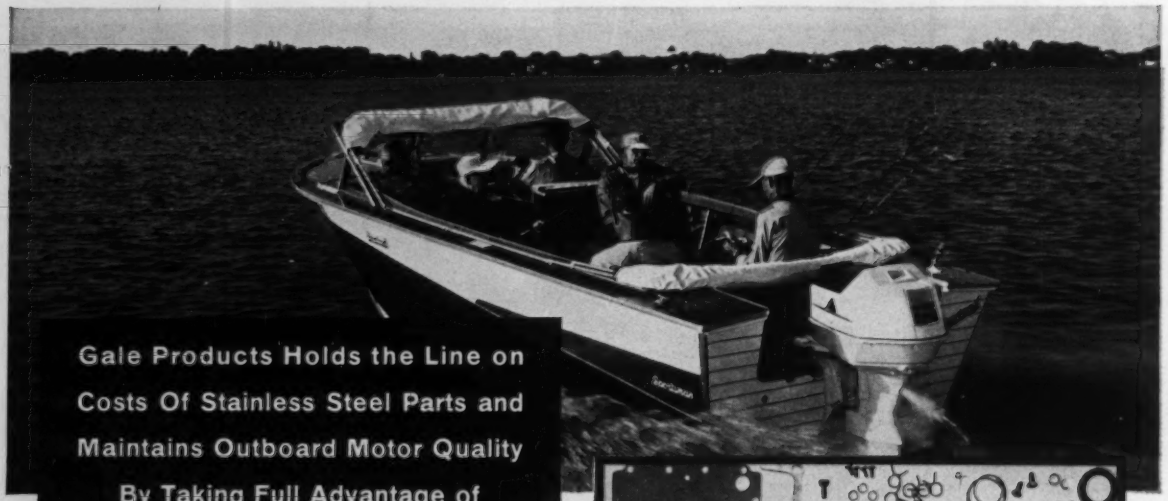
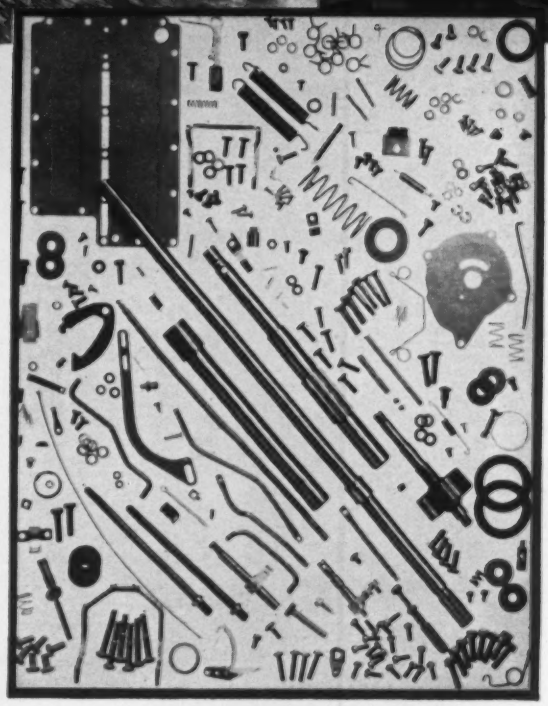


Gale Products Holds the Line on Costs Of Stainless Steel Parts and Maintains Outboard Motor Quality By Taking Full Advantage of HOUSE OF STAINLESS Metallurgical Assistance.



These 300-plus stainless steel parts are used in Gale's 60 h.p. Sovereign Outboard and contribute substantially to the top performance of this motor.

An equally important contribution to Gale production is the continuing cooperation between Gale engineers and House of Stainless metallurgists.

For example, a recent review of manufacturing procedures and material indicated that a change in the type of stainless being used for specific parts would cut part costs without sacrificing quality. Production on this basis has since confirmed the soundness of the suggestion.

Why don't you let this metallurgical service go to work for your product? Suggesting a change in the type of material is only one phase of this all-inclusive, free service. Just ask our representative to tell you more about it or call us. Remember, we back up this service with complete warehouse stocks and direct mill shipments to fill your needs.

Photos courtesy Gale Products, Division of Outboard Marine Corporation, Galesburg, Illinois

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YOUR DEPENDABLE SOURCE FOR CARBON AND STAINLESS STEEL; ALSO INCO ALLOY BAR, WIRE AND STRIP.

and hardnesses with minimum set-up time.

• Efficiency, capacity, and yield of a tandem mill are increased when the mill is teamed up with a Sendzimir unit.

Tandem mill efficiency would be improved by increasing the average starting and finishing gage, and by eliminating small tonnage, odd width, and odd gage orders from tandem mill schedules. (Rolling those orders from hot bands in the cluster mill would free the tandem stands for longer runs.) And increasing allowable gage on hot rolled bands sent to the tandem mill would make for increased tonnage from the hot strip mill.

Yield would be increased by holding closer gage tolerances from end to end and across the strip width.

And offgage material at the coil ends would be rolled down to the correct gage.

Proposed practice: Finish only those coils where finished thickness is to be about 0.010 in. or above on the tandem mill. Lighter gages would be rolled on the tandem mill to about twice the finished gage; then the coils would be taken to the cluster mill—in the hard, as-rolled condition—for single pass rolling to gage.

Finishing of the lighter gages on a separate stand would help increase tonnage on the tandem mill. (Production losses are usually experienced as finish gage goes down.)

• Mill design can be adapted to roll virtually any width strip.

The mill housing is so designed that deflection is distributed across the entire strip width. It provides continuous backing to the roll cluster; the heaviest cross section is at the center of the mill, where deflection would be greatest. Short, heavy columns carry small roll separating stresses. Result: A rigid mill design, said to be adaptable to unlimited strip widths. (One mill engineered by Waterbury Farrel is designed to roll sheets up to 144 in. wide.)

Capacity to roll wider sheets or strip would make it possible for a Sendzimir mill to handle coils from a 72 in. hot strip mill. Subsequent slitting would produce two, 36 in. wide coils for tin plating.

Filled Nylon Bushing Stands up to Overloads

A BUSHING made of filled nylon is still in service after five years use in the lead screw idler gear of an engine lathe at Weiland Clutch Co., Cleveland. Excessive loads, imposed when deep cuts were made, caused other bushing materials to fail in 40 to 80 hours.

The bushing material, called Nylatron GS (nylon with a molybdenum disulfide filler), was supplied by Polymer Corp., Reading, Pa. The molybdenum disulfide provides permanent lubrication. It also increases the strength and rigidity of the bushing. Excessive loads that have stripped teeth from the idler gear haven't damaged the bushing. Recent inspection showed the bushing to be free of deformation, fissures, or fractures.

Resilience allows the bushing to yield slightly under load. Dust, grit, and metal particles are often caught between the bushing and the shaft, but the bushing flexes to prevent abrasion or scoring of the shaft.

Tool Life Soars

CARBIDE inserts have replaced high speed steel cutters in a large scalping mill at the Terre Haute (Ind.) Works of Anaconda Aluminum Co., says Wesson Corp., Ferndale, Mich.

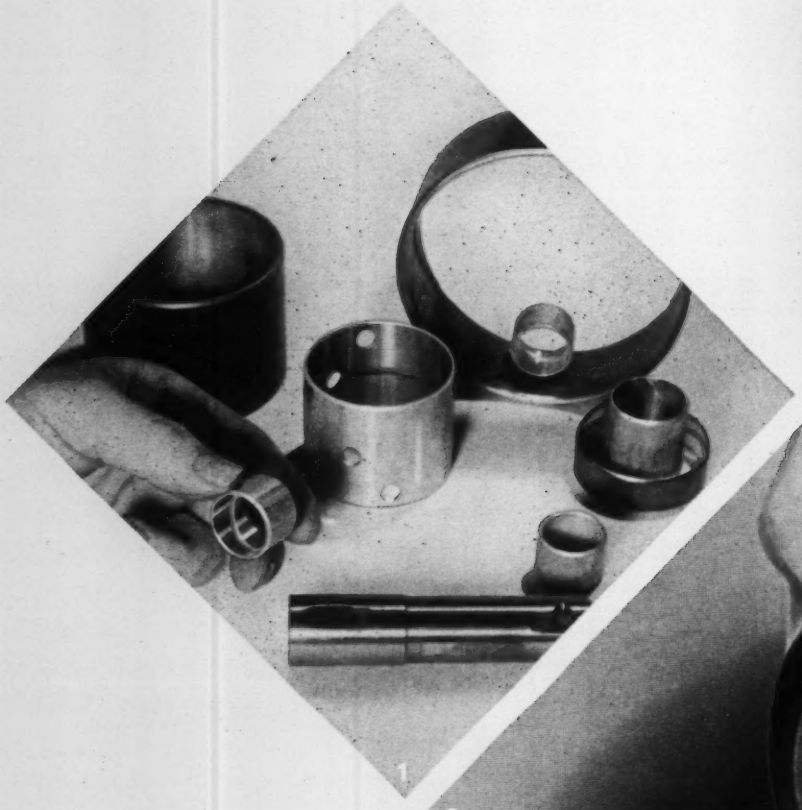
Results: Service life has been increased from 8 hours per cutter to 480 hours between blade indexes. In addition, cuts have been increased from 3/8 to 1/2 in. deep.

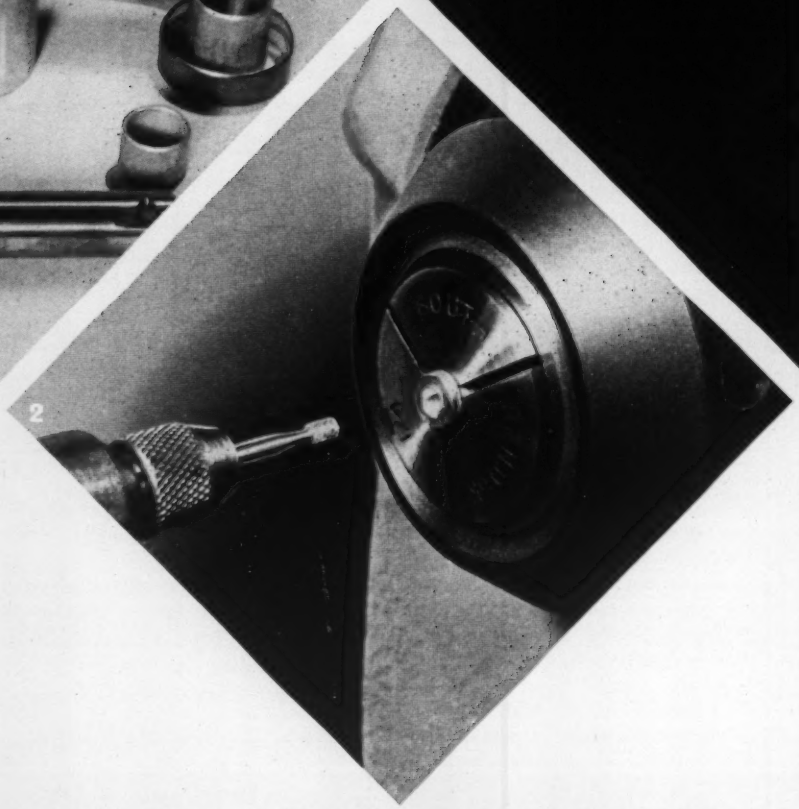
Machine Grouping Saves on Expenses

SEVERAL savings are made possible by this U-shaped machining layout at Locomotive & Car Equipment Dept., Erie, Pa., General Electric Co.

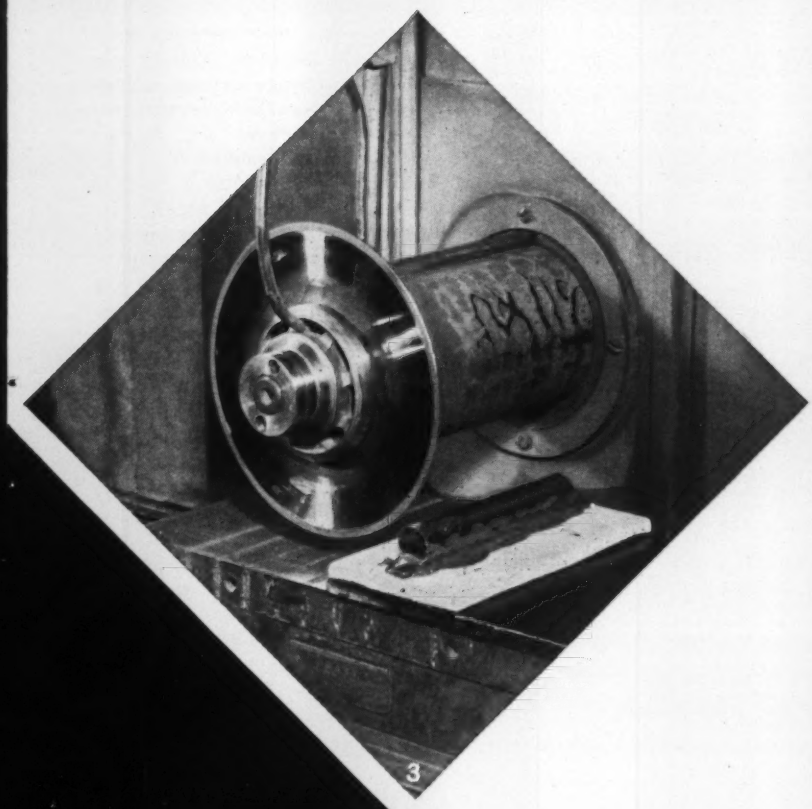
The company's method engineers report that the setup substantially reduces direct labor and eliminates the usual delays and expense of inter-machine transportation. In addition, material savings go up to 26 per cent due to the narrower 1/16 in. saw kerf (compared with 1/4 to 3/8 in. required with standard turret lathe parting tools).

Bar stock is first cut into suitable length slugs on the bandsaw, drilled out on the drill press, and then moved to a Warner & Swasey, 2AC, single spindle, automatic chucker where it is automatically machined to close tolerances.





Industrial Distributors (Sales), Ltd.



Look at the materials (and costs) that diamonds can cut

Everybody knows that industrial diamonds are used to grind and sharpen carbide tools. But did you know that diamonds can also cut and polish nonferrous metals like aluminum and bronze as well as glass, germanium, ceramics, marble?

Diamonds handle all of these jobs because only diamonds possess a unique *combination* of properties: excellent cutting ability coupled with fantastic endurance. Result: diamond tools last longer than anything else you can use. Your people spend more time producing, less time changing tools.

If you cut, sharpen, or smooth in your business, you can probably use diamonds to advantage. Test them against the method you're using. You'll find out how efficient—and economical—a diamond can be, especially now.

Best grit for metal-bond wheels

A new impact crushing method for natural diamonds (developed by the Diamond Research Laboratory in Johannesburg) is producing the strongest and most durable diamond grit ever obtained for metal-bond wheels. Your tool and wheel manufacturer is ready to help you select the diamond tool that's right for *your* job.

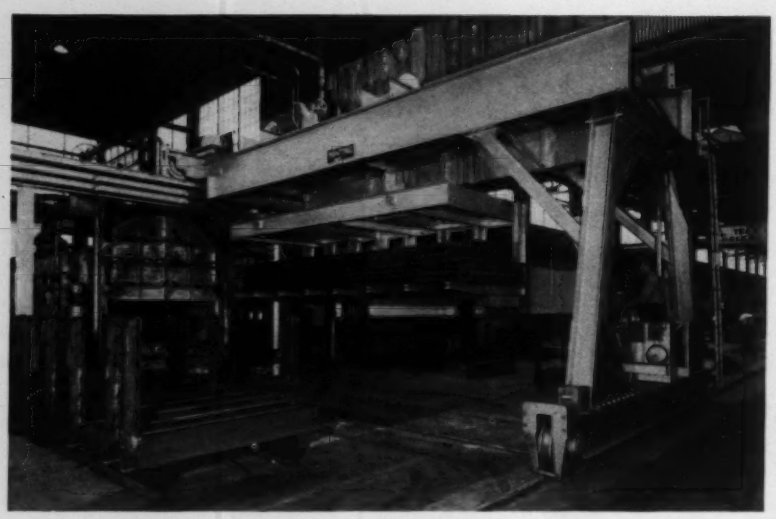
1 **Bimetal Bushings** *made at Federal-Mogul-Bower Bearings, Inc., Detroit, have steel shells with inserts of sintered bronze, tin, lead or aluminum. Diamond boring machine produces 15,000 in one shift. Inside diameters are finish-machined to tolerances of ±0.0005 inch.*

2 **Hardened Steel** *is ground with diamond-coated quills for precision grinding of small internal diameters at National Diamond Laboratory, Peekskill, N. Y. Miniature diamond wheels have greater strength and durability than small grinding tools containing conventional abrasives.*

3 **Germanium and Silicon** *are sliced with diamond wheel at Standard Rectifier Corp., Santa Ana, Calif. Cutters are powdered-metal matrix impregnated with small, blocky natural diamonds. No wear has been visible after months of use.*

4 **Copper-Plated Rollers** *of cast iron, steel or aluminum for gravure printing are smooth-finished in a single pass with diamond lathe tool at Southern Gravure Service, Louisville, Ky. Surface finish of about 6 microinches results. No coolant is required.*

Industrial diamonds cut practically everything...especially your production costs



Single leg unit handles load of steel bars. This . . .

Gantry Crane Increases Heat Treat Capacity

• HEAT TREATING capacity has been increased 28 per cent without the addition of furnaces at the Harvey, Ill., plant of Bliss & Laughlin Inc. by the use of a new gantry crane.

The loading and unloading of the four furnaces in the heat treating department were bottlenecks for the producer of cold finished bars.

Each furnace takes a 30 ton load. That's more than the capacity of the overhead traveling crane which spans the entire area. Floor space is at a minimum, yet a lot of material must be moved. Heat treating became the controlling factor, holding up other departments.

Bliss & Laughlin considered several means of improved handling—rebuilding the crane, adding another, or purchasing wheeled handling equipment. Rebuilding would have been too costly, the firm decided, and the already crowded floor area would not permit wheeled handling equipment of suitable size.

• The gantry crane, built by Whiting Corp., Harvey, preempts little of the valuable floor space, eliminates the log jam of bars to be heat treated, and increases the tonnage of bars that can be handled each shift.

The crane is a single leg gantry unit. One side rides on the rail of an overhead crane still in use. The rail was extended in front of the four furnaces. The leg of the crane runs on a floor track. The furnace man runs the crane; about 1 hour's service per day is all that is needed.

Whiting also designed a cradle to pick up the bar stock from the storage racks. When a furnace is pulled with the new arrangement, the hot bars are picked off the furnace car and set aside to cool. The preloaded rack of bars to be heat treated is set on the car which is rolled back into the furnace.

• The four furnaces are used for annealing, strain tempering, stress relief, spheroidizing, and normalizing of the cold finished bars. One unit, equipped with controlled atmosphere, is used for carbon restoration of the bar surface.

Bliss & Laughlin has kept records of the furnace time since the crane went into operation. During one month, the average increase in overall tonnage was 28.4 per cent, the percentage increase per furnace ranged from 13.3 to 40.4.

Reduced maintenance is expected to be an additional benefit. Increased handling speed has prevented excessive loss of furnace temperature. The temperature cycling under the earlier system caused refractory breakdown and stressed alloy support members. Bliss & Laughlin also reports lower gas consumption.

The cost of the installation, the firm estimates, was about $50,000, which includes setting the rail track in the floor for the gantry leg. Increased use of the furnaces, plus reduced maintenance and refractory savings, will pay for the equipment, the company expects. An added benefit: A reduction in the delay of other operations.

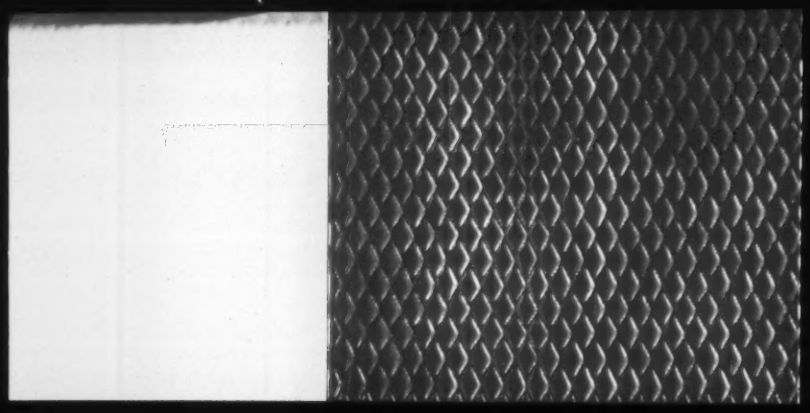
Stainless Grade Cracks Costly Nut Problem

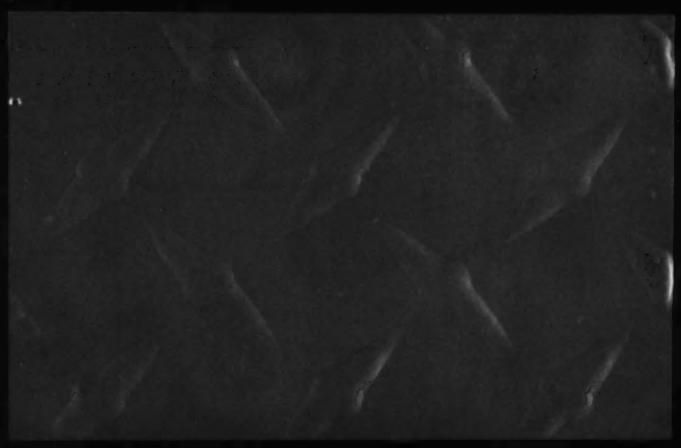
HIGHER PRODUCTION and a lower reject rate were gained by using a Carpenter No. 10 stainless to crack a troublesome nut problem at Detroit-Diamond Screw Products Co., Wyandotte, Mich.

Clean threads are produced easily and consistently, and tool life is extended. In addition, the material eliminates one annealing process.

Wire grades previously used were unsatisfactory because they work hardened too rapidly. Prior to piercing, No. 10 work hardened to Rockwell C 24, while previous stainless materials averaged Rockwell C 39 to 40. The company also reports that thread tapping was difficult, and the reject rate was high.

The material is a modified austenitic, chrome-nickel steel that is particularly useful for cold headed and upset parts. It work hardens much slower than any of the conventional 18-8 analyses steels, says the supplier, Carpenter Steel Co., Reading, Pa. The material is said to be suitable for making fasteners, cold heading bolts, screws, and instrument parts—and jobs involving severe coining, extrusion, and swaging.





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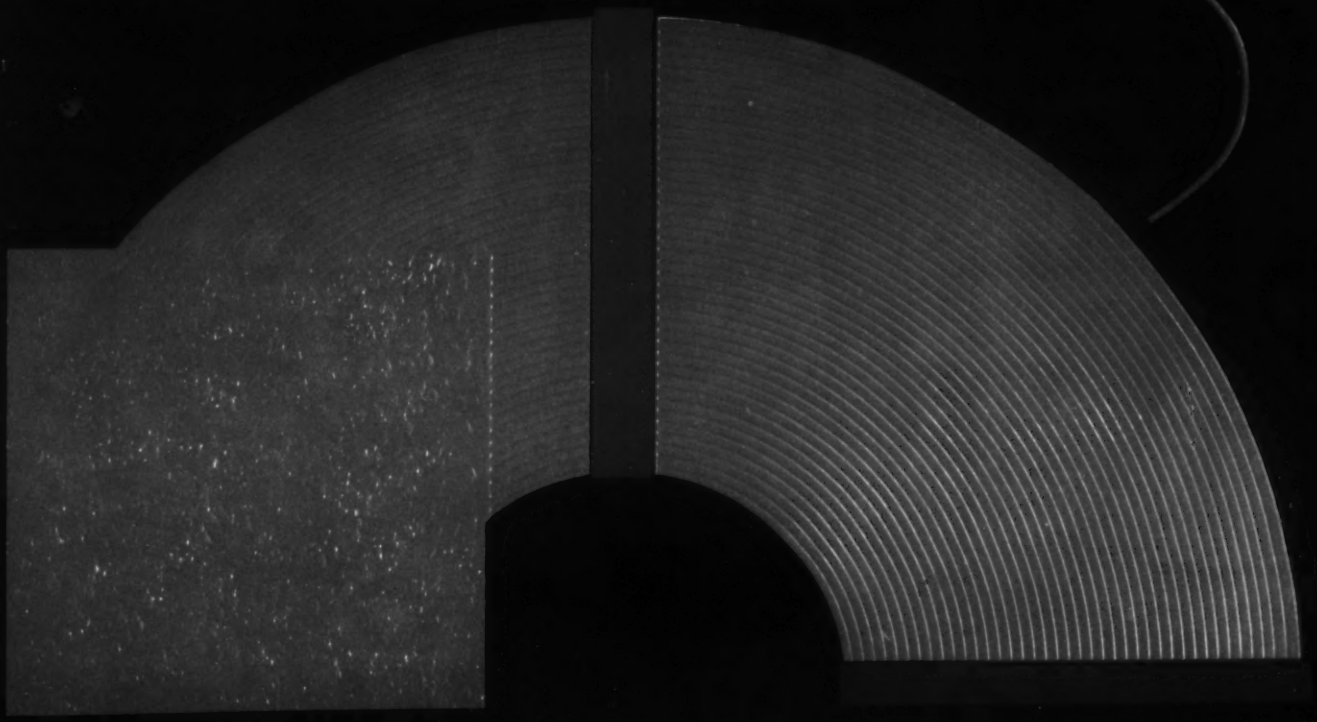

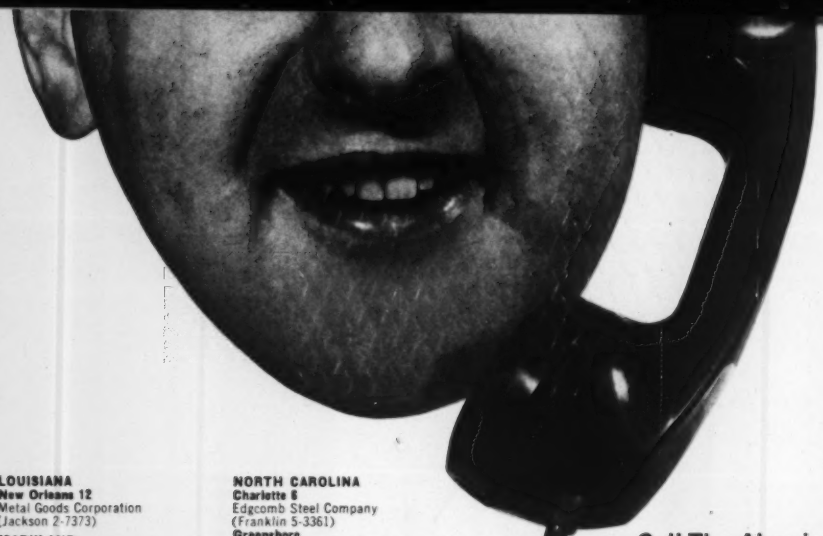

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Minneapolis 13
Steel Sales Co. of Minnesota
(Sterling 1-4893)
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Williams and Company, Incorporated
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Tulsa 13
Metal Goods Corporation
(Temple 6-2561)
OREGON
Portland 9
Pacific Metal Company
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PENNSYLVANIA
Philadelphia 34
Edgcomb Steel Company
(Garfield 3-6300)
Philadelphia 33
Metal Supply Company
(Center 6-0220)
Philadelphia 40
Whitehead Metals, Inc.
(Baldwin 9-2323)
Pittsburgh 33
Williams and Company, Incorporated
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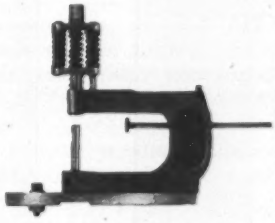
Foundry Helps Pick A Casting Process

BY TALKING over problems with a foundry, a manufacturer realized several advantages in the manufacture of pawls used in brake regulators.

1. The part is now cast to exact dimensions that require no machining on the teeth or other surfaces. 2. Inspection and gaging have been simplified. 3. Specifications are easily met. 4. Over-all savings are estimated to be about 30 per cent. 5. Appearance is improved, and the parts weigh less and are easier to handle.

The problem: Extensive machining was required on the bore, faces, ends, and teeth of three pawls used in brake regulators. The foundry (Empire Steel Castings Co., Reading, Pa.) helped out by showing that shell castings could help to trim machining and other costs.

The parts are specified in cast steel conforming to ASTM A148-58 normalized and tempered. Minimum tensile strength is 90,000 psi; minimum yield is 60,000 psi; and elongation is 20 per cent in 2 in. The Brinell must be between 180 and 220.



STRIPPIT self-contained units are the most efficient, most economical method of punching holes in metal. That's why Boeing Airplane Company has utilized thousands of them in the production tooling for the latest, most devastating version of the famous Stratofortress.

STRIPPIT Units consist of holders containing the punches, dies, stripping guides and stripping springs. Any good mechanic can quickly set up these units to punch the pattern of holes desired. The "C" Unit shown here, for instance, is ideal for close center-to-center rivet holes in wing and fuselage sections. This "C" Unit also features a pedestal die for punching holes in angles, channels, shapes and extrusions.

All STRIPPIT Units are independent, self-contained and self-stripping. They provide permanent alignment of punches and dies for precise hole positioning. There are a tremendous variety of STRIPPIT Units with capacities up to 3.5" hole diameters and ¾" thick material.

Find out how The STRIPPIT System can speed your production and cut your press "down-time" to a minimum. Write now for free catalog.

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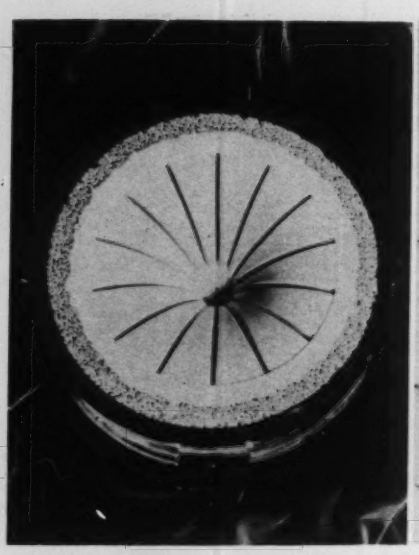
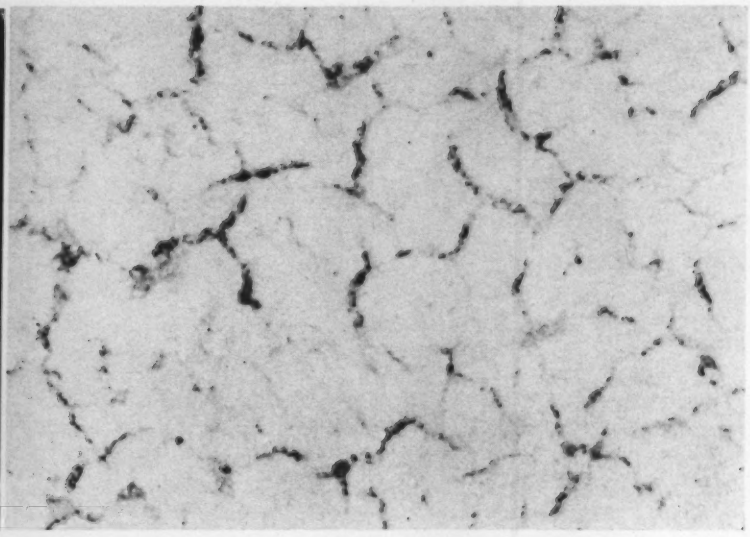
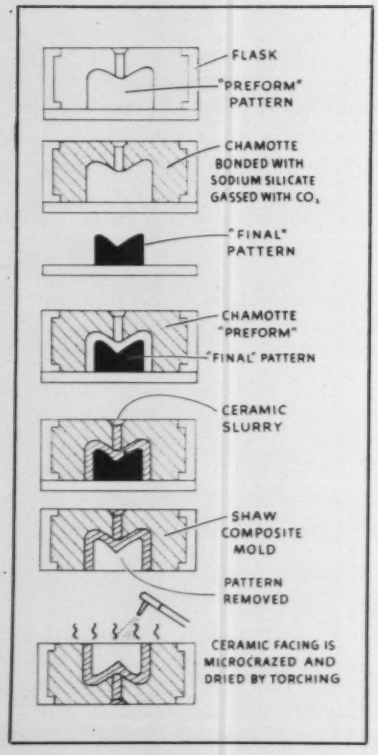




A fine ceramic is poured against backup sand, then microcracked. The . . .

Changes Speed Casting Process



• A CHANGE in moldmaking practice may permit mass production of precision castings by the Shaw process. (See STEEL, Mar. 6, p. 68.)

The modified process involves a composite mold. It has a low cost sand type backing with a special ceramic facing; the mold material can be re-used for backing sand; and the composite replaces the solid ceramic previously used. The "bakeout" step of the Shaw process has been reduced from a 4 or 5 hour cycle to minutes, making possible a straight line production cycle for molds, states Irwin Lubalin, general manager, Shaw Process Div., Avnet Electronics Corp., Port Washington, N. Y.

• The new mold arrangement has the main body (about 95 per cent by volume) made of sand; the facing is the Shaw ceramic slurry.

Backing and facing can be reclaimed after the mold is broken to free the casting; sandblasting removes the remaining pieces of facing adhering to the metal. The ceramic facing has little tendency to burn in.

To make the mold, two patterns are needed. The preform pattern is 3/32 in. oversize to allow for the thickness of the ceramic facing. Backup mix, prepared from sodium silicate and reclaimed sand and mold facing, is rammed over the preform. The mold is placed in a bell jar and hardened with CO_2.

The Shaw ceramic slurry needed for the facing of the composite mold is a blended formula of refractory powders, ethyl silicate based binder, and a gelling agent. The operator pours the slurry to fill the gap between the final pattern and the hardened backing. The fine slurry penetrates the interstices of the surface of the porous backing to form a physically interlocked bond. Gelling of the slurry requires 2 to 3 minutes, and the fine ceramic facing of the composite mold has then been shaped. The composite mold is lifted off the pattern by a foot operated stripping plate.

After molds are stripped from the patterns, they are placed on a roller conveyor running through a "torching" zone where the volatiles are ignited and consumed. The burnoff process also develops the microcrazed structure of the typical Shaw mold. The cope and drag molds are then moved to a high pressure torching zone where they are brought to incandescence.

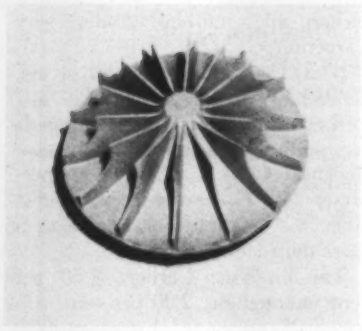
• The composite structure of the mold shortens the burnoff cycle, cuts total time sharply.

By the former process, the thickness of the mold slowed the burnoff or torching step. Times in the order of 4 or 5 hours were common, since the volatiles had to be removed from the entire mold and had to escape through the refractory. Now, with the thin refractory facing against a porous backing, volatiles are removed in less than 5 minutes.

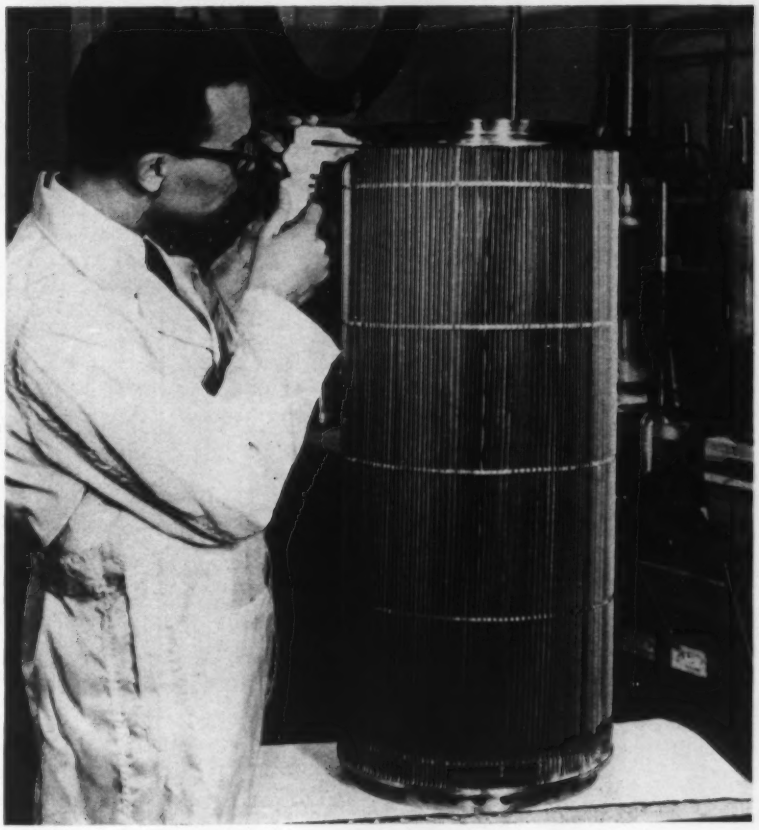
In casting, the metal is poured down the riser as rapidly as possible. When the casting is cool, an air hammer is used to free the casting from the mold. Any of the facing material still clinging to the casting is removed by blasting.

• The shorter time cycles make mechanization possible.

Although the sequence described is done on a manual bench molding basis, the process is being considered for automation. The company's engineers have developed an automatic molding machine, a 24 station unit, that will produce molds at the rate of 120 per hour. It premixes and feeds the slurry, as well as making the rest of the mold; and one operator can supervise one or more of the units.



COST OF THIS CASTING is reduced by modifications of Shaw process



With 150 sq ft of wire mesh, this . . .

Stainless Filter Element Cleans Jet Bomber Fuel

• STAINLESS STEEL wire, hundreds of miles of it, woven into cloth and sintered in special furnaces, makes up the element for filtering jet fuel in the B-70.

Total filtering area is 150 sq ft, requiring 250 miles of fine wire. The filter unit (it weighs less than 30 lb) must be able to take shock, have a pressure drop across the element of less than 1 psi while handling the full fuel flow of the bomber's six engines, remove all particles over 0.003 in., resist corrosion, and not lose particles into the filtrate.

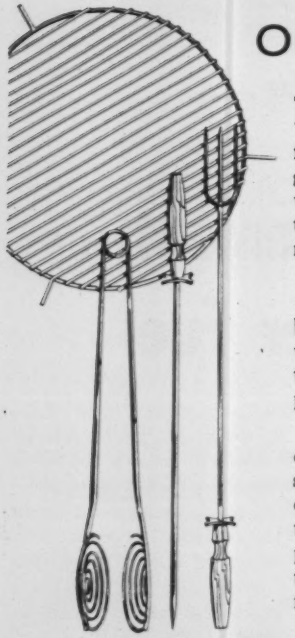
Corrugated construction makes it possible to get the filtering area into a unit that is only 38 1/8 in. high, 14 in. in diameter. Heliarc welding was used to attach the filter medium to the adapter heads.

Smaller units, with still finer mesh size, are used at each individual engine of the B-70 to take out any remaining particles over 0.0015 in. The same principles were applied in the small units.

• Units similar to those for the B-70 will be needed for the protection of supersonic, commercial jet planes.

The unusual device was built by Aircraft Porous Media Inc., Glen Cove, N. Y., a subsidiary of Pall Corp.

Example: FINER "TOOLS" FOR OUTDOOR LIVING



There are no finer grills, implements or "tools" for outdoor living than those made from Continental Wire. There's a temper, gage and finish for almost any product—with smooth clean surface for fast production, and quality to take the forming you require for your product.

Your product may be entirely different—hardware for venetian blinds, or ball bearings, or automotive parts. For a wide variety of applications you can get just the right wire at Continental, in the temper, size, and steel analysis you require.

For your wire requirements in low, medium low, medium high or high carbon steels, round or special shaped, in many different coatings, drop us a line. Our mill technicians have solved hundreds of wire problems, and will be happy to give you the benefit of their experience. Write for free copy of the Continental Wire Manual.

WIRE SPECIALISTS FOR OVER HALF A CENTURY

CONTINENTAL STEEL
CORPORATION • KOKOMO • INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE®, BRYTITE®, FLAME SEALED®, Coppered, Tinned, Annealed, Liquor-Finished, Bright and special shaped wire. Also Welded Wire Reinforcing and Galvanized Fabric. Nails, Continental Chain Link Fence and other products.

New Steel Extends Press Tool Life

A NEW tungsten tool steel has increased service life of rotary press punch holders to a year—vs. four to six weeks for conventional, high carbon, high chrome steel—at the Poughkeepsie (N. Y.) plant of IBM Corp. The new steel, called Hi Wear 64, was developed by Carpenter Steel Co., Reading, Pa.

The tools are subjected to severe abrasion in the manufacture of ferrite magnetic memory cores for electronic computers on a rotary tableting press.

As the press head revolves, some of the highly abrasive ferrite powder flies into the machine and works its way between the punch holder shafts and bearings. Abrasion must be avoided because a tolerance of plus or minus 0.0001 in. is held between the carbide rod and tube that form the core—and between the punch holder and bearing. The cores cannot vary more than one-tenth of a milligram from nominal weight—1.3 milligram.

Eight punches are operated at once on one machine vs. one punch before the new steel was adopted. Results: A production increase of 800 per cent and reduced manufacturing costs. Previously, wear on the side and head of the shaft caused tools to become loose—and close tolerances couldn't be met.

• **Hardens in Oil or Air**—The steel is said to combine deep hardening at low temperatures with excellent wear resistance and dimensional stability. The low hardening temperature makes for minimum decarburization—and the material machines at least as well as standard high carbon, high chrome grades, says Carpenter.

It can be hardened in oil or air, depending on mass, without distortion or cracking. But oil hardening produces maximum hardness—Rockwell C 64 to 65 after tempering at 350° F—and is recommended when the smallest tool dimension is more than 1 in.

The analysis: Carbon, 1.50 per cent; manganese, 2.00 per cent; silicon, 0.25 per cent; chromium, 0.90 per cent; molybdenum, 1.00 per cent; and tungsten, 4.00 per cent.

Combination 46- x 114-inch Blooming-Slabbing Mill and 38- x 53- x 122-inch 4-high Plate Mill.

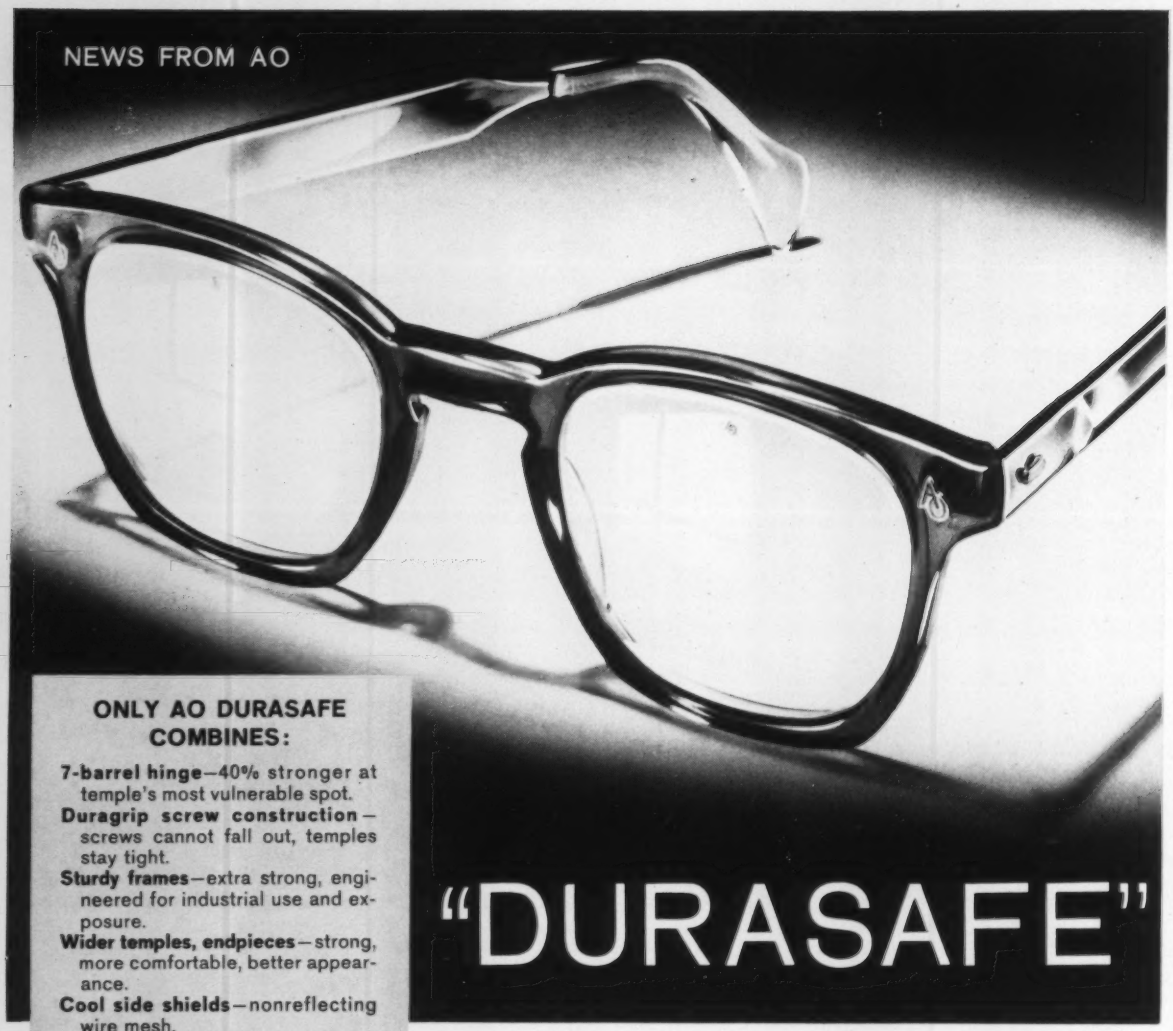
BLAW-KNOX COMBINATION BLOOMING–SLABBING AND PLATE MILL

Blaw-Knox designed and built this unique Combination Blooming–Slabbing and Plate Mill. Other Blaw-Knox equipment for the metals industry includes: Complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals • Sheet and strip processing equipment • Electrolytic tinning, annealing, and galvanizing lines • Seamless pipe and tube mills • Draw benches and cold draw equipment • Blaw-Knox Medart cold finishing equipment • Iron, alloy iron and steel rolls • Carbon and alloy steel castings • Fabricated steel plate or cast-weld design weldments • Steel plant equipment • Heat and corrosion resisting alloy castings • Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Ave., Pittsburgh 22, Pa.

BLAW-KNOX

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms • Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes • Towers and Special Structures • POWER: Power Plant Specialties and Valves

NEWS FROM AO



"DURASAFE"

...the glasses workers wear willingly

Your plant eye protection program's *full* effectiveness is governed by the workers' willingness to wear safety glasses (or goggles) regularly. In the new Durasafe, you have fitting qualities and a choice of colors and combinations that satisfy everyone . . . combined with the latest safety features that mean maximum protection and durability.

This wearer acceptance can be a big factor in preventing costly eye injuries. For the new Durasafe will protect against 80% of the eye hazards in an average industrial plant with a full eye protection program.* For full information on the glasses workers *want and will wear*, call your AO Safety Products Representative, or write for Bulletin S-1013.

*Other types of AO safety goggles are needed to cover special hazards.

ONLY AO DURASAFE COMBINES:

7-barrel hinge—40% stronger at temple's most vulnerable spot.
Duragrip screw construction—screws cannot fall out, temples stay tight.
Sturdy frames—extra strong, engineered for industrial use and exposure.
Wider temples, endpieces—strong, more comfortable, better appearance.
Cool side shields—nonreflecting wire mesh.
Easy to identify—AO monogram on frames and lenses identifies Durasafe at a glance.

TAKE YOUR CHOICE OF

Solid colors
Smoke (F9800SM)
Mahogany (F9800M)
Pink Crystal (F9800PC)
Two-tones
Smoke on Crystal (F9800SC)
Mahogany on Crystal (F9800MC)
Black on Crystal (F9800BC)
Temples
Plastic comfort cable
Metal core plastic spatula
Aluminum with plastic tip
Full range, bridge & eye sizes
Safety Rx or plano lenses
With or without side shields

Your Surest Protection . . . AO SURE-GUARD Glasses

American Optical COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

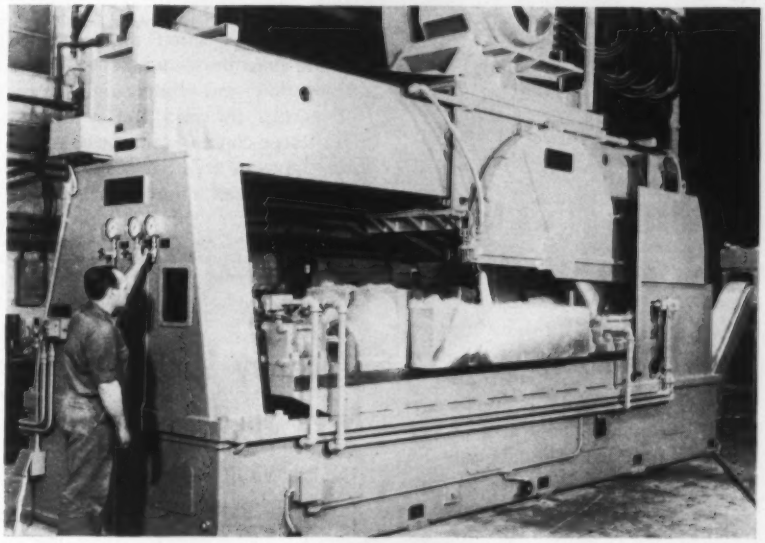
Big Circular Saw Cuts Aluminum Billets

LARGE ALUMINUM ALLOY billets and slabs can be cut speedily to close tolerances with an automatic cold saw made by Loma Machine Mfg. Co. The surfaces are smooth.

The equipment features a hydraulically operated circular saw which handles billets 36 in. in diameter and 20 in. slabs 80 in. wide. The machine will take 100 in. blades. A 200 hp motor operates at 3000 or 6000 fpm.

Outstanding items include an overhead carriage containing all the essential moving parts. A safety feature makes the saw jamproof.

For further information, *write* Loma Machine Mfg. Co., 114 E. 32nd St., New York 16, N. Y.



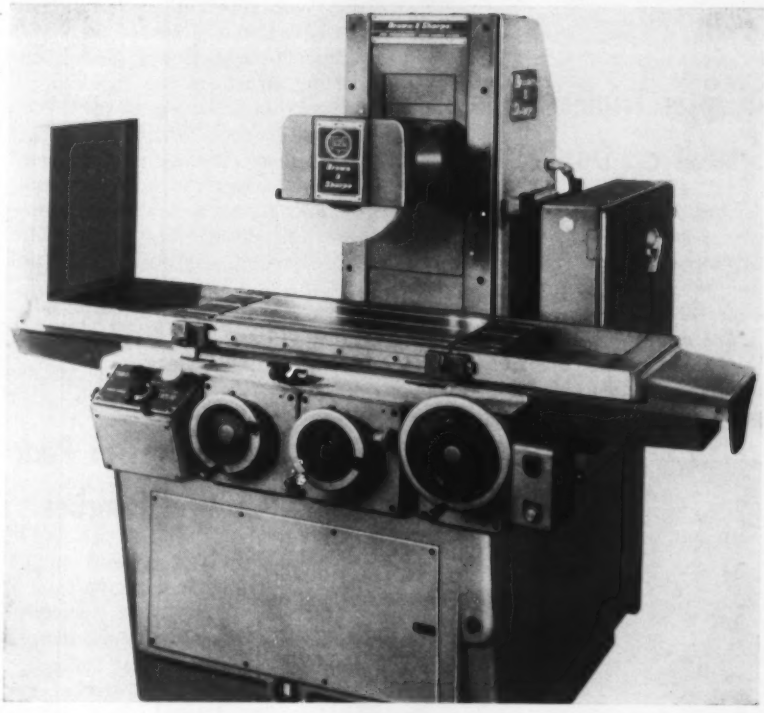
Surface Grinder Features Wide Table

DIES are ground accurately by the Micromaster surface grinder which features a table that is wide in proportion to its length, says Brown & Sharpe Mfg. Co. It is also well suited to general production work. Reason: An automatic slot and surface grinding attachment, a wet grinding attachment, and a vertical position indicator.

The machine has a heavy antifriction, permanently lubricated spindle powered with a 5 hp direct coupled motor. The spindle is flange mounted, allowing exceptionally accurate slot or shoulder grinding in die sections, says Brown & Sharpe. That feature assures accuracy during the life of the machine.

The spindle upright moves on its own "V" and flat way transversely; the table is also mounted on a similarly constructed way for longitudinal movement to assure long life.

The low pressure hydraulic sys-



tem is easily accessible. A separate automatic system furnishes lubrication to all bearing surfaces.

Standard equipment furnished includes: Rapid positioning at 50 ipm for fast setup; automatic truing at 10 ipm in both directions; infinitely variable table speeds to 125 fpm.

For further information, *write* Brown & Sharpe Mfg. Co., Providence 1, R. I.

Dry Blasting Unit Needs 60 psi Air at 15 cfm

A VERSATILE, dry blasting and peening machine (Model DV100) requires a minimum air supply of 60 psi at 15 cfm. The maker says a 1½ hp compressor and a 60 gallon tank are usually adequate for most operations.

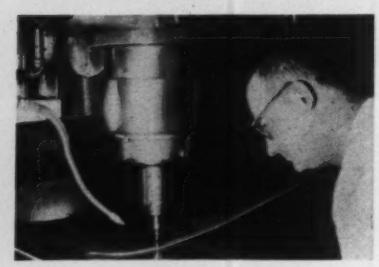
The machine accommodates 5 to 6 lb of abrasive material per loading and has a replaceable dust filter. Material life is about 25 hours of operating time.

For further information, *write* Perfecto-Peen Div., Aero-Test Equipment Co. Inc., 8401 Chancellor Row, Dallas, Tex.

Adapter Triples Spindle Speeds on Duplicators

A HIGH speed spindle adapter triples spindle speeds on large vertical duplicating machines to produce fine finishes and accuracy with small diameter tools.

The unit (Model HTL-1) permits the use of small diameter cutters with shanks up to ½ in. The company says the adapter is particularly advantageous in machining large workpieces, such as casting dies and molds.



A 3 to 1 increase in cutter speeds for machines that are usually limited to 1000 rpm eliminates the need to transfer work to smaller machines for fine, small diameter cuts. The time required to install the adapter is minutes—to transfer work often requires hours.

In addition, when work is done on one machine setup, fewer errors in location and dimensional accuracy creep in, says the company. The tracer control and cutter maintain the same relative position after the high speed spindle is installed.

For further information, *write* Permanent Mold Die Co., 2275 E. Nine Mile Rd., Hazel Park, Mich.

Vibratory Screen Doesn't Need Special Supports

IN A HORIZONTAL vibratory screen made by Comco, the screening (or conveying) decks are balanced against each other. All dead weight counterbalances are eliminated.

The screen decks are supported on the base exactly in their center of oscillation (a point of no oscillation) and transmit no vibration to the base frame. The company says neither dampeners nor special supporting structures are required.

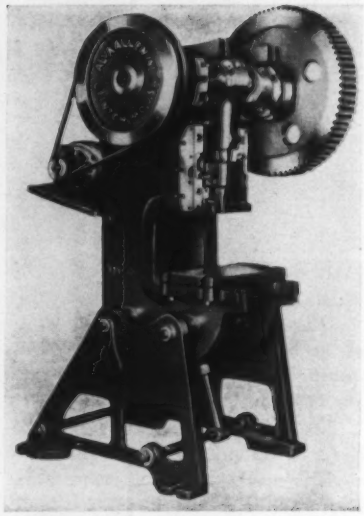
Shear block drive springs keep the screen decks oscillating against each other, alternately storing and releasing energy in a rhythm that requires almost no additional power from the motor. The drive is also self-adjusting, continuing its full stroke action regardless of load.

For further information, *write* Comco Corp., 5421 Lancaster Ave., Philadelphia 31, Pa.

Back Geared Presses Pack Slow, Powerful Punches

A LINE of back geared punch presses ranging in capacity from 2 to 25 tons gives slow, powerful strokes. They're easily changed from repeat to nonrepeat action.

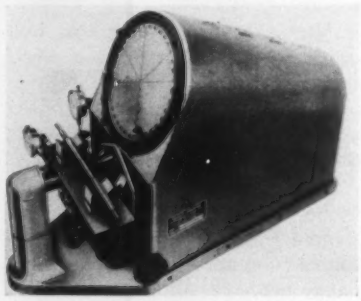
The company says strokes per minute or flywheel revolutions per minute can be reduced as desired without sacrificing loss of press tonnage capacity. Six standard models are available. Special models can be ordered.



For further information, *write* Alva Allen Industries, 1001-15 N. Third St., Clinton, Mo.

Optical Comparator Has Sustained Accuracy

RUGGED construction and sustained accuracy at relatively low cost is the claim for the Apex optical comparator.



The portable unit weighs 35 lb. The company says special design features eliminate distortion, provide reliable readings at any point on the screen, and give true magnifications in outer image zones. Nonradial straight lines do not appear to be bent.

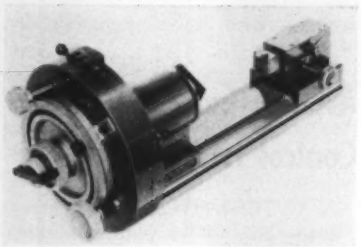
For further information, *write* Rankin Bros. Engineering & Sales Inc., 11090 S. Alameda St., Lynwood, Calif.

Precision Index Center Permits Fine Tolerances

FINE tolerances are possible in inspection of work on centers, and in jig boring, milling, and jig grinding work on centers with the Moore precision index center.

The unit is also accurate on form grinding of spiders, splined punches, gear die punches and dies, and sectional parts of dies where revolving the part on centers or in a spindle is necessary.

The unit has a special ball construction spindle, 192 lapped fit balls with ±0.000005 in. tolerance under load, a lapped carbide index plug, and four lapped fit carbide plug-in



stations. The extra plug-in station permits the user to turn his work 180 degrees at any time to get his work on dead center. It can also be used to reorient for a different set of angles on the same piece. Offset tailstock construction allows clearance for the wheel when slot grinding. Sealed against dirt, the unit can be used in wet grinding.

For further information, *write* Moore Special Tool Co. Inc., 800 Union Ave., Bridgeport 7, Conn.

Decorative Electroplate Is Multihued, Durable

MULTICOLORED, electroplated finishes on textured metal surfaces have been introduced by Metal & Thermit. They provide extradurable decorative finishes for metals, says H. D. McLeese, vice president and general manager, Plating Div.

Special electroplated finishes are deposited on textured metal surfaces. Buffing removes the top coat from raised areas, displaying and accenting the underlying metal against a background of the electroplated deposit.

The company says many effects

HOW TO BEAT THE HEAT

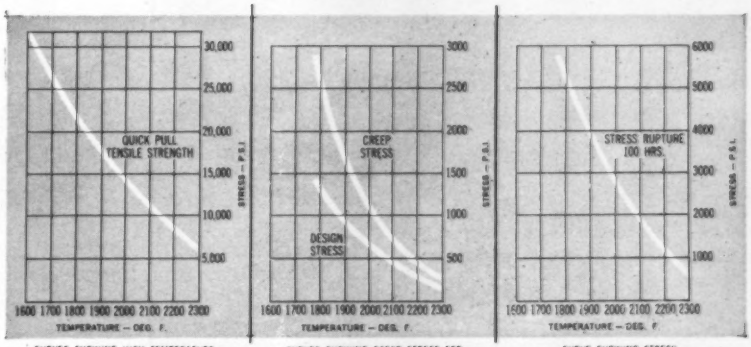
for strong high alloy requirements in the 1,800° to 2,300° F range!

DURALOY HOM*

*Covered by U.S. Patents

casting alloy

Duraloy "HOM" is a special high nickel alloy developed to produce castings that meet high temperature requirements, especially when castings are subject to oxidizing atmospheres.



CURVES SHOWING HIGH TEMPERATURE SHORT-TIME TENSILE STRENGTH OF DURALOY-HOM

CURVES SHOWING CREEP STRESS FOR CREEP RATE OF 1% IN 10,000 HOURS AND RECOMMENDED DESIGN STRESS FOR DURALOY-HOM

CURVE SHOWING STRESS TO RUPTURE AT 100 HOURS FOR DURALOY-HOM

Castings of DURALOY "HOM" are now being produced by our three methods: static, centrifugal and shell molded. Write today for additional information on this versatile new alloy.

ALLOY CASTING INSTITUTE (ACI) MEMBER

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

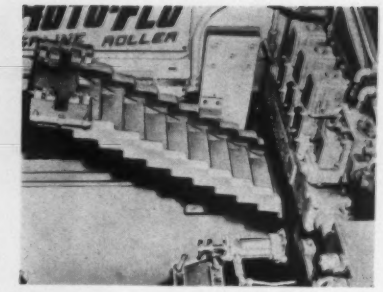
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23908 Woodward Ave., Pleasant Ridge, Mich.

can be obtained by varying the base metal, the electroplating process, and the texturing method. Potential applications include appliance and business machine housings, automotive interiors, and trim.

For further information, *write* Plating Div., Metal & Thermit Corp., Rahway, N. J.

Device Quickly Loads, Unloads Long Parts

AN AUTOMATIC device designed by Gear-O-Mation loads, locates and unloads long, slender parts in production machines quicker and easier than an operator could. The maker



adds that the design also prevents jamming or damage of the parts.

Blank workpieces are introduced at the top of an unusual waterfall chute that prevents excessive rolling speed or jamming of the shafts. Each time shafts go down a step, they are slowed and straightened across the chute. The chute leads to a barrel shaped escapement mechanism that has four axial slots along its periphery.

As the barrel indexes, one part enters the slot and is rotated upward 90 degrees to the load position. The blank is picked up by live head and tailstock centers and inserted into the machine.

After processing, the head and tailstocks return it to the same slot in the barrel. Following the next index, the finished part rolls out of the barrel and slides down to a belt conveyor. Loader and machine motions can be electrically interlocked (through limit switches) so the complete cycle is automatic.

In one application, the equipment has increased production from 300 to 470 shafts per hour.

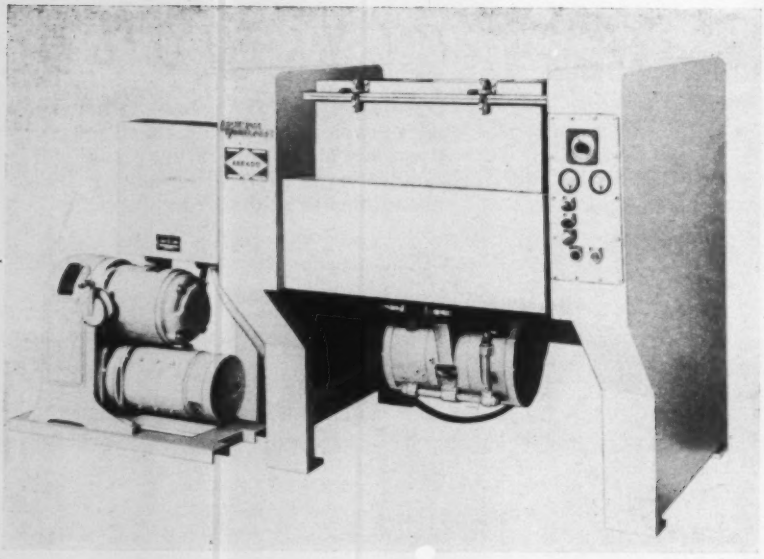
For further information, *write* Gear-O-Mation Div., Michigan Tool Co., 7173 E. McNichols Rd., Detroit 12, Mich.

Average Current Density Control Is Automatic

AN AUTOMATIC, average current density control for plating applicaitons has been developed by a Detroit firm. The company says the control approaches (as nearly as possible) true, automatic, current density control on continuous production operations where racks have approximately the same area. Equipment for remote operation can be ordered.

Ammeter, voltmeter, automatic-manual switch, and raise-lower pushbuttons are included.

For further information, *write* Dresser Electric Co., 2705 Wight St., Detroit 7, Mich.



Vibratory Metal Finisher Is Versatile

CLEANING, descaling, deburring, radiusing, finishing, burnishing, coloring, and abrading of castings, forgings, and other work can be done on the Jackson Vibrado finishers.

The units are available in sizes with 1/10 to 20 cu ft capacities. They have full radius, rollover tub design, 180 degree tilt for easy unloading, lower over-all height for loading and unloading convenience, and controlled orbital flow pattern with synchronous vibration. The manufacturer says the units require no special flooring for installation and operate quietly when mounted directly to the plant floor.

For further information, *write* Abrado Finish Corp., 1750 Elizabeth Ave. N. W., Grand Rapids, Mich.

Unit Feeds Delicate Parts in 5 to 7 in. Bowls

PARTS up to ¼ in. long in a 5 in. bowl and ½ in. long in a 7 in. bowl can be handled by the Elk-O-Matic Model 51 parts feeder.

Track width of the cast aluminum bowl is 5/16 in. for a 5 in. bowl and ½ in. for a 7 in. bowl. The bowl can be constructed for clockwise or counterclockwise feed. Model 51 is furnished with a separate controller.

The 3600 electromagnetic vibrations per minute feed even delicate

parts with minimum risk of damage. No setup is required. Parts are simply dumped into the bowl, says the company. Model 51 is the smallest unit in the line.

For further information, *write* Elk Engineering Works, St. Marys, Pa.

Ultrasonic Generator Puts Out 7000 Watts Peak

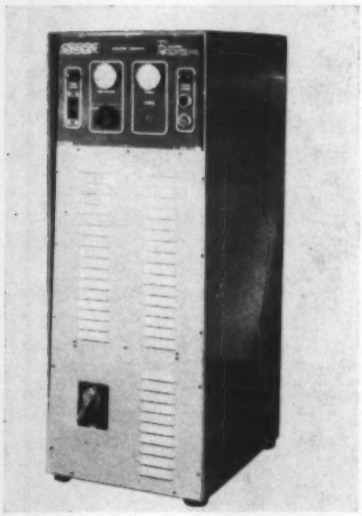
AN ULTRASONIC generator called the Model LG-3500A Sonogen offers an average power output of 3500 watts with a peak on pulses of 7000 watts.

Because it automatically adjusts itself to variations in cleaning load, solution temperature, and tank volume, the company says it's ideal for high speed cleaning of steel strip, multiple strand wire cleaning machines, long conveyorized systems, and large volume or heavy duty batch operations.

The automatic load system compensates for frequency and impedance simultaneously, to keep the acoustic energy in the cleaning system at a peak performance level. It's designed to drive Sonogen-Z transducers.

Normally using bulkhead or immersible transducers, LG systems can also be supplied with side mounted, bottom mounted, or opposed transducers. The choice depends on the cleaning problem.

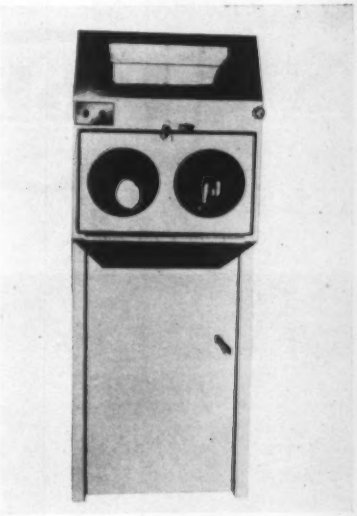
For further information, *write* Branson Instruments Inc., 40 Brown House Rd., Stamford, Conn.



Wet Blast Cabinet Takes on Many Jobs

JOBS for the Pressure Blast Jr., a general utility wet blast cabinet, include heat treat scale removal, cleaning prior to plating, cutting tool honing, and general metal finishing in large and small plants, says the manufacturer.

The blast gun and slurry agitation system are cited as two important features. The blast gun is suspended by its air and slurry hoses and is trigger actuated. A mechanical agitation system handles the slurry.



The agitator consists of a sealed shaft combing through the bottom of the hopper fitted with four stainless steel paddles. A ¼ hp motor rotates the shaft. It's fully guarded against abrasive contamination. The stainless steel unit measures 57 x 22 x 22 in.

For further information, *write* Pressure Blast Manufacturing Co. Inc., Manchester, Conn.

Machine Chamfers Springs

A MACHINE is being offered for such jobs as chamfering the top and bottom edges of helical steel springs. It's a self-contained unit with a rotating friction, drive work fixture, and two adjustable grinding lathes mounted on a common base.

When chamfering springs, the parts are manually loaded into re-

USE THE COUPON BELOW FOR MORE INFORMATION ON NEW ECONOMICAL

PYROGARD C
FIRE-RESISTANT FLUID

See ad on following pages

Mobil

Mobil Oil Company, Room 2058E
A Division of Socony Mobil Oil Co., Inc.
150 East 42nd Street, New York 17, N.Y.

Gentlemen: I am interested in learning how new PYROGARD C fire-resistant fluid can aid my operation.

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POSITION _____
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CITY _____
ZONE STATE _____

FOR IMPROVED PLANT SAFETY PLUS

NEW, ECONOMICAL

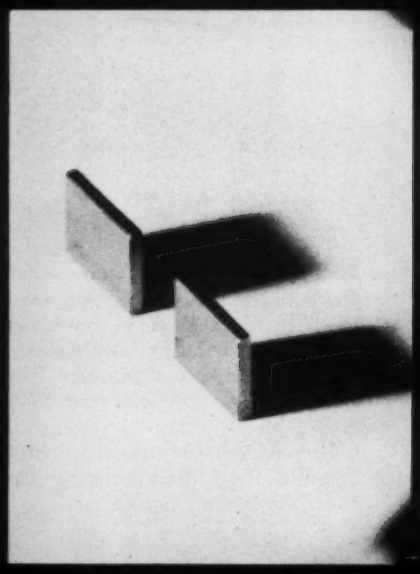
PYROGARD C

FIRE-RESISTANT FLUID

Mobil

HERE'S HOW PYROGARD C CAN HELP YOU!

— PYROGARD C helps you protect your property and personnel against fire. Ignition resistance is demonstrated here. Hydraulic oil (left) bursts into flame immediately while PYROGARD C (right) resists combustion when poured onto steel plate heated to 1000F.



Good anti-wear properties as[illegible] long pump life — PYROGARD C fire-resistant fluid is designed for most pumps and pressures encountered in plant hydraulic equipment . . . gives excellent protection against pump wear for fluids of this type. Pump vane at left is new. Vane at right has 1000 hours of service with PYROGARD C at 160F and 1000 PSI. Wear is almost undetectable.

Compatibility with seals, met[illegible] installation — PYROGARD C fire-resistant fluid is easily installed because it has no adverse effect on most packings, seals, or hoses, and is non-corrosive to metals normally found in plant hydraulic systems. Containing effective rust inhibitors, PYROGARD C fire-resistant fluid gives excellent protection against rusting wherever it contacts metal.

POSITIVE HYDRAULIC RESPONSE...

Now, the makers of world-famous Mobil petroleum hydraulic oils bring you PYROGARD C, a new fire-resistant fluid that offers positive hydraulic response plus improved plant safety . . . at low cost.

PYROGARD C fire-resistant fluid is a water-in-oil emulsion containing special chemical addition agents. It's been thoroughly field tested in actual service . . . will give excellent performance under conditions such as those encountered in press welders, furnace-door openers, ladle-tilting mechanisms, scrap balers, and die-casting machines.

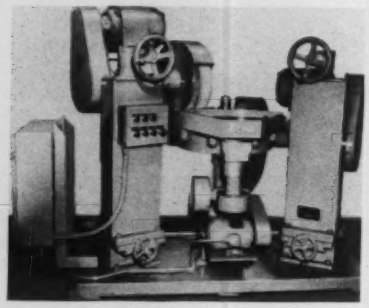
The major benefits provided by PYROGARD C fire-resistant fluid are detailed below. In addition you receive the help of experienced Mobil Engineers in applying it to your equipment. Their specialized know-how in the installation and maintenance of fire-resistant fluids will make the procedure sure and simple. Examine the benefits of PYROGARD C fire-resistant fluid —then contact your nearest Mobil Representative.

Long-term stability in storage and use assures uninterrupted production—PYROGARD C fire-resistant fluid is highly stable even at higher-than-normal temperatures—resists breakdown, foaming and water separation—keeps pump parts and screens free of deposits. And with PYROGARD C, water evaporation is retarded by a thin oil skin that forms when the emulsion is at rest, yet readily remixes when fluid is agitated (shown above).

Unusual flow properties assure positive hydraulic response, yet reduce leakage—PYROGARD C fire-resistant fluid has unusual viscosity characteristics . . . resists leakage at static joints, yet gives rapid flow and response elsewhere in the system. In apparatus above, a specially designed "leak chamber," introduced into hydraulic system, shows the PYROGARD C leaks less than ordinary hydraulic oil.

MOBIL OIL COMPANY, 150 East 42nd Street, New York 17, N. Y.

tainer pockets in the work fixture and are continuously rotated through the grinding wheel chamfering stations. They automatically eject from the work fixture following the chamfer operation.

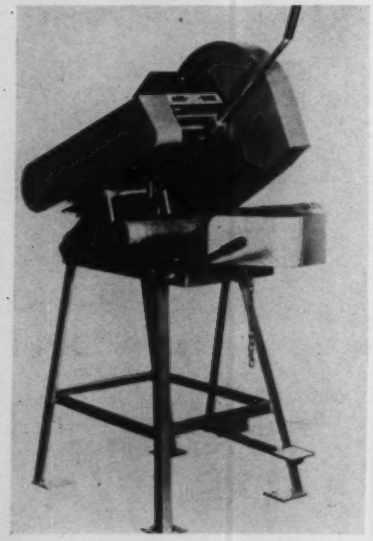


A hopper feed arrangement can be provided to automatically load noninterlocking springs. The machine will chamfer 2000 to 4000 springs an hour with manual loading techniques and 7000 to 8000 an hour with the automatic hopper feed arrangement.

For further information, *write* Acme Mfg. Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

Bench Model Saw Uses 20 in. Abrasive Wheels

THE BENCH model Abr-A-Saw uses all sizes of abrasive wheels up to a maximum of 20 in. and motors up to 10 hp. It cuts up to 6 in. pipe and shapes and 4 in. solids in ferrous and nonferrous materials.



The lightweight, portable unit may be mounted on a bench with lever controlled chain vise, or on a stand with a pedal assembly leaving the operator with both hands free. You also can specify a Hi-Boy model that provides a 12 in. pipe cutting capacity, or with a steel cutting blade and oil spray attachment for cutting nonferrous materials.

For further information, *write* Collins Machinery Corp., 955 Monterey Pass Rd., Monterey Park, Calif.

Electrode Designed for Out of Position Work

VERTICAL UP welding with no electrode breakdown or loss of arc direction is one of the capabilities

of an electrode developed by A. O. Smith's Welding Products Div.

It also produces virtually pitless vertical down welds that pass rigid standards of x-ray inspection, says the company.

The electrode, a variation of the conventional E6011 class, has been especially designed for out of position work in pipe welding, general maintenance, shipbuilding, and other high standard welding jobs with alternating current—especially those where fitup is poor. Primarily responsible for the improved welding characteristics is a coating formulation that strengthens weld crater, says the maker. The Navy and the American Bureau of Ships have approved the rod.

For further information, *write* Welding Products Div., A. O. Smith Corp., 3533 N. 27th St., Milwaukee, Wis.

NEW Literature

Write directly to the company for a copy

Glass Fiber Fabrication, Use

An eight page brochure discusses glass fiber applications and the manufacturing methods of producing them. In addition to discussing characteristics and capabilities of filament winding and centrifugal molding, the booklet describes the advantages of matched metal molding and premix molding for specific types of products. Apex Reinforced Fibre-Glass Div., White Sewing Machine Corp., Washington & Elm Streets, Cleveland 13, Ohio.

Microhardness Testing

A reprint gives a definition of microhardness and its dependence on load, comparison of microhardness measurement and microhardness testing, and details on the evaluation of test indentations by a Micro Durogram. William J. Hacker & Co. Inc., P. O. Box 646, West Caldwell, N. J.

Temperature Recording

A 12 page illustrated booklet describes and illustrates how a Brush Universal Carrier amplifier and a platinum resistance sensor are applied to provide a combination for recording temperatures from −320 to 2000° F. The company says the recording technique deviates 1/100 of 1 degree. Brush Instruments Div., Clevite Corp., 37th & Perkins, Cleveland 14, Ohio.

Arcwelding Booklet

No. 166 of the "Hobart Arc Welding News" features time and money saving applications. The 24 page booklet covers welding from many different areas of the country. Hobart Bros. Co., Troy, Ohio.

Galvanizing Bulletin

The bulletin of the European General Galvanizers Association is intended for users of galvanized steel. English, French, Italian, and German editions are published. Applications of galvanized steel are reviewed in each issue. Zinc Development Association, 34 Berkeley Square, London W. 1, England.

NEW BOOK

Fundamental Principles of Powder Metallurgy, W. D. Jones, St. Martin's Press Inc., 175 Fifth Ave., New York 10, N. Y., 1032 pages, $30

The techniques of powder metallurgy are discussed in great detail. Included is a discussion of powder manufacture, pressing, shaping without pressing, sintering, attainment of specific qualities, continuous powder metallurgy, and methods of control.

HUSKY to handle Petroleum Molecules

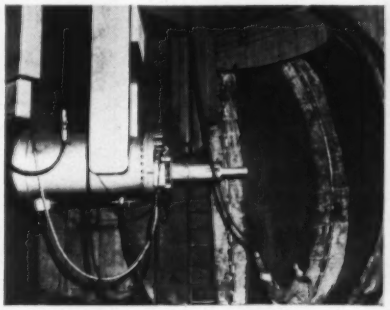
Hortonclad spherical reactor for a petroleum catalytic reforming unit.

Welded Hortonclad spherical reactor for oil company catalytic reforming unit works under very high pressures. Chicago Bridge and Iron Company uses radiography to prove every seam sound.

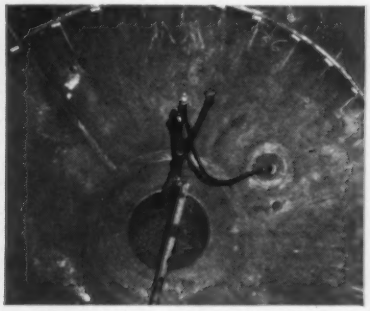
STURDY STUFF, this husky refinery unit. Seventeen feet in diameter, made of 3.65-inch-thick Hortonclad plate composed of ¼-inch 405 stainless steel on carbon steel. Seams between segments and end covers are welded—then radiographed to check for complete, continuous fusion.

Welding is steadily taking on bigger and more important jobs and radiography is providing the proof of quality. If you would like to learn how radiography can save you time and help build business, have a talk with an x-ray dealer or write us for a Kodak Technical Representative to call.

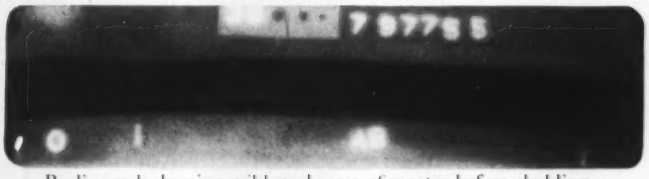
Technician positions Kodak Industrial X-ray Film, Type AA.



2-million-volt x-ray unit set to radiograph intermediate seams.



Roundabout seam is radiographed with 50-curie pill of Cobalt 60.



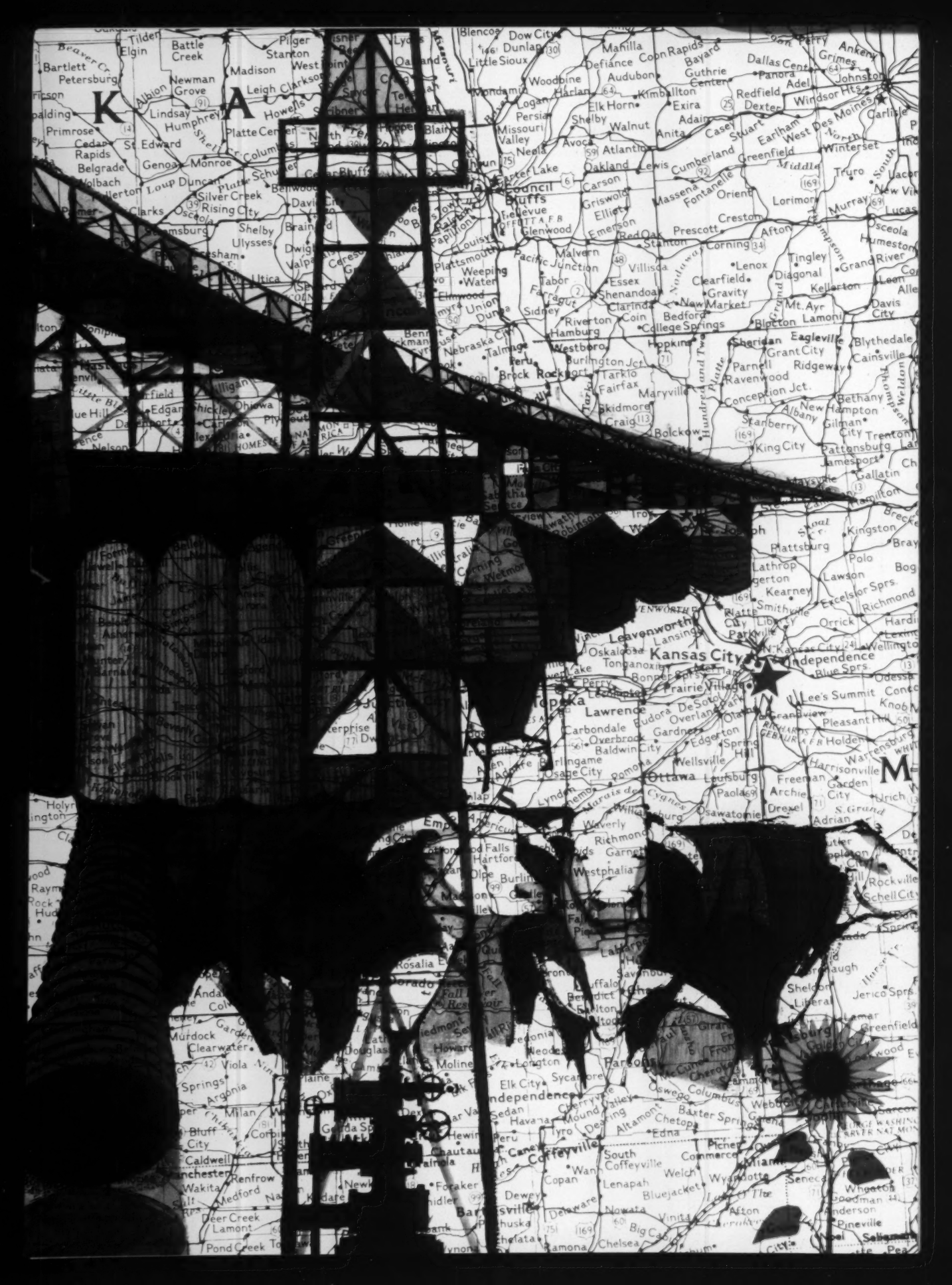
Radiograph showing mild steel seam of reactor before cladding.

EASTMAN KODAK COMPANY
X-ray Sales Division Rochester 4, N.Y.

Now . . . Ready Pack in ROLLS and SHEETS Kodak Industrial X-ray Film, Types AA and M in 200-ft. rolls (16mm, 35mm, 70mm) and sheets (8 x 10, 10 x 12, 11 x 14, 14 x 17).

- No darkroom loading—film sealed in a light-tight envelope.
- Just place Ready Pack in position and expose.
- Film protected from dust, dirt, light and moisture.
- In the darkroom—remove film from envelope and process.

Kodak
TRADE MARK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67 years of service to the Industrial Middle West

INLAND STEEL IS HERE

This . . . is a sweeping territory. It embraces the Panhandle and the northern plains of Texas—the rolling hills of western Missouri—the limitless vistas of Oklahoma, the golden fields of Nebraska and Kansas, Denver and even a corner of Arkansas. Within its boundaries lie cities and towns whose names made pioneering history. Here, is the Eisenhower Museum and the Truman Library, John Brown's cabin and the grave of Buffalo Bill. Here the Pony Express was born. Here, immense herds of cattle pounded through to northern markets. Here, the Indian watched the coming of the white man—and here, man learned to conquer the ravages of merciless windstorms and the devastation of the dust bowl.

Today this is a land of gushing oil and a tremendous oil industry, richly producing farms and a vigorous business life. Today, the area erects great bridges, oil derricks, storage tanks, corn cribs, grain bins and driers; produces culverts, electronic pumping equipment, trailers, tandems, sucker rods, and pipe to span a nation. Today the territory's farming methods have changed from the power of horses to the thundering horsepower of modern farm machinery.

One of a series depicting market areas served by Inland · Art by Don Neske

And today, Inland feeds steel and more steel into the ever-hungry maw of this amazingly expanding territory.

To the thousands of businessmen and industrialists throughout the territory, Inland is an old friend—a name as familiar as one's next-door neighbor. For Inland has been *here* for all these many years—growing as the territory's industries developed—contributing its knowledge and experience—sharing in the life of the territory.

Now . . . Inland experience—bred, developed and tested in the very states which make up this vast territory—is at the service of every manufacturer. For Inland is more than a name—more than a source of steel. Inland is a living part of each of these states. Their growth is Inland's growth. Their future is Inland's, too.

INLAND STEEL COMPANY

30 West Monroe Street Chicago 3, Illinois

Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis Kansas City • Milwaukee • New York • St. Louis • St. Paul

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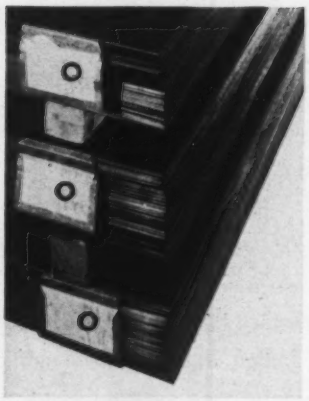
**Division*

INLAND

YOUR RED CIRCLE ORDER BECOMES A BALL OF FIRE AT... Acme-Newport

When you discover a soft spot in your steel stocks, ask Acme-Newport for their *Red Circle Service* on your fill-in order. Such orders really burn their way through this place, for every man has explicit instructions to give them preferential handling from order desk to loading dock. Modern facilities, conscientious personnel and the flexibility of an operation this size, permit exceptional service combined with strict adherence to your specifications and the quality standards of this 76-year-old basic steel producer. So when you need good steel *fast*, call for *Red Circle Service*.



Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

PRODUCTS OF ACME-NEWPORT STEEL

Hot Rolled Steel in Coil	Cold Rolled Steel in Coil (*full hard only*)	Plates (*5/16" and lighter*)
Hot Rolled Pickled Steel in Coil	Cold Rolled Sheets	Electrical Sheets
Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

Ingot Production Leveling Out

STEEL INGOT production appears to be leveling out slowly after rising steadily since mid-March. In that period, weekly output climbed from 1,573,000 net tons to a peak of 2,077,000 in the week ended May 27. Since that week, there have been two straight declines, bringing output for the latest week of record to 2,042,000 tons. Significantly, production has exceeded 2 million tons for four successive weeks.

SEASONAL LETDOWN — Steelmen attribute the easing in the last couple of weeks to the seasonal letdown prior to the vacation suspensions. They don't anticipate any marked slump the rest of this month. June output is expected to top the 9-million-ton mark for possibly the best monthly showing since March, 1960.

DEMAND SLOWER — While demand pressure is off (the daily order rate is estimated to be 5 to 10 per cent below May's) and production is likely to drift to lower levels over the summer, the vacation slowdown isn't expected to be as sharp as it has been in most recent years. Some mills think third quarter volume will equal the second quarter's.

REVISE ESTIMATES—It now looks as if first half ingot output may total around 45 million net tons, substantially under the 60.7 million produced in the like 1960 period. However, production this year has been more closely geared to demands as consumers depleted stockpiles accumulated in 1960. More steel leaders are boosting their earlier production estimates for the year—they think output will at least equal the 99.3 million tons poured in 1960.

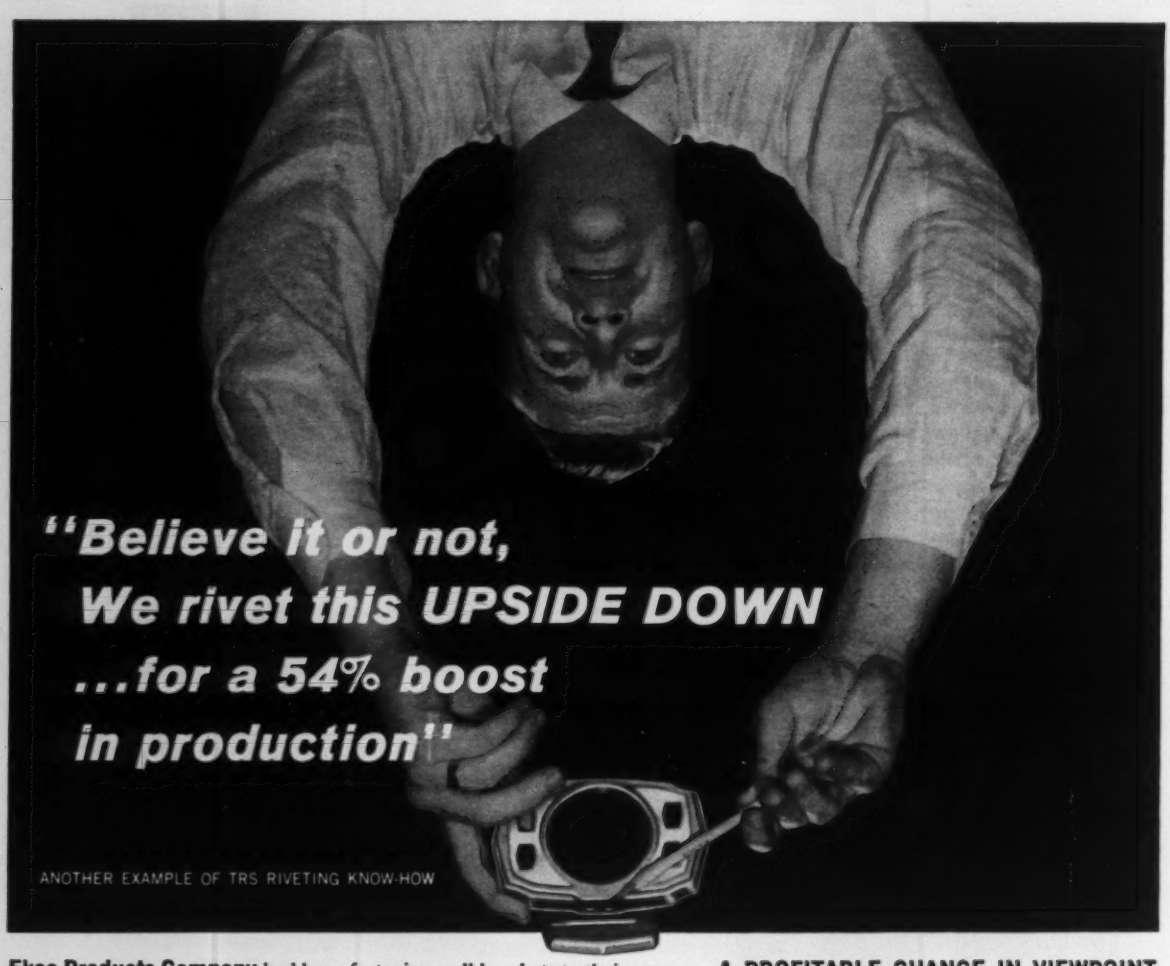
SHIPMENTS OFF PACE—Despite the substantial rise in steelmaking since March, mill shipments of finished products have not improved to the point where significant lengthening of delivery promises has been necessary. In fact, many users are still relying on quick deliveries.

LAG SHOWN — The April statistical report of the American Iron & Steel Institute (latest available) shows shipments of finished products that month lagged the rise in production. The total, 5,144,470 net tons, was only 86,947 tons above the March figure, a rise of less than 2 per cent. Ingot production rose 498,611 tons in April from March, about 7 per cent. Even allowing for scrap loss (estimated at 1.8 million tons), it's apparent that considerable semifinished steel must have gone into mill inventories to care for prompt shipment requests of customers. Indications are May and June shipments will be higher than April's.

PRICES WATCHED — Recent reductions in stainless steel, seamless and electricweld line pipe, and oil country goods appear to cloud the price outlook. Steelmakers have claimed that they need higher prices to offset wage cost boosts since the last general price hike of $4.50 a ton in 1958. It's pointed out, however, that prices of the major carbon steel products (sheets, plates, bars, shapes) haven't been changed and that the declines do not reflect market weakness. The reductions are said to be in recognition of competitive situations that have prevailed for some time. They do not necessarily remove the possibility of selective product price hikes later this year when another wage boost is scheduled to go into effect.

WHERE TO FIND MARKETS & PRICES

	News	Prices
Bars, Merchant	126	133
Reinforcing	126	134
Boiler Tubes	...	126
Canada	...	141
Charts:		
Finished Steel	...	131
Ingot Rate	130	...
Scrap Prices	...	145
Clad Steel	...	139
Coal Chemicals	...	141
Coke	...	141
Comparisons	...	131
Contracts Placed	129	...
Contracts Pend.	129	...
Electrodes	...	141
Fasteners	...	136
Ferroalloys	...	142
Fluorspar	...	141
Footnotes	...	136
Imported Steel	...	141
Ingot Production	130	...
Metal Powder	...	141
Nonferrous Met.	148	150
Ores	128	141
Pig Iron	128	140
Piling	...	133
Plates	152	133
Plating Material	...	151
Prestressed Strand	...	136
Price Indexes	...	131
Producers' Key	134	...
R.R. Materials	...	136
Refractories	...	141
Scrap	144	146
Semifinished	...	133
Service Centers	128	140
Sheets	127	134
Steel Shipments	145	...
Silicon Steel	...	135
Stainless Steel	125	139
Strip	127	135
Structurals	128	133
Tin Mill Prod.	152	135
Tool Steel	152	139
Tubular Goods	145	139
Wire	145	135



Ekco Products Company had been fastening wall brackets to their soap dishes and glass holders with solid aluminum rivets . . . hand-assembling the components and placing the assembly in a die which required two press strokes to fasten the parts. Production volume had reached a ceiling, and cost reduction was becoming imperative.

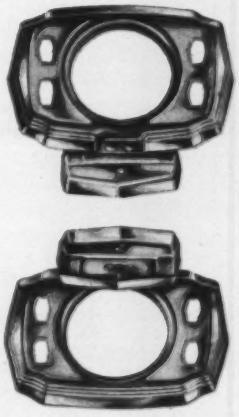
Automatic machine riveting, with semi-tubular rivets, would offer substantial savings, but obstructing flanges on the product itself seemed to rule it out . . . until the TRS man suggested a new viewpoint. Working with Ekco engineers, he proposed feeding the rivets upside down and inverting the assembly for the fastening operation, providing unobstructed travel for the rivet-setting driver. The rivets were kept with the heads visible, as required for good appearance.

Result: no hand assembly, daily output up 54%.

Let the TRS man look over your assemblies. You'll find that he has the viewpoint of a manufacturing engineer, and a knack for making fastening simpler, faster, better.

Of course he will recommend TRS rivets. But he will give you sensible reasons why they are more reliable in quality and uniformity. Superior quality control is one big result of a five-year modernization of this pioneer company — modernization of people, policies, production and service facilities. *You'll like to do business with the new TRS . . . we'll make sure of it.*

A PROFITABLE CHANGE IN VIEWPOINT



In the Ekco-Autoyre glass holder (shown) and soap dish, the rivet clinch must not be visible, but normal setting with the rivet heads on the visible surface was impossible because flanges on the product obstructed motion of the setting driver. To solve the problem, a semi-tubular rivet was designed with a flat head, to be fed and set in an inverted position with a TRS Model 103L machine. The end of the driver was shaped to form the clinch, and the machine was fitted with an air-operated pusher to eject the finished product.

Don't Buy Riveting Machines until you learn how the TRS **PAR** *process revolutionizes riveting*

TRS®

TUBULAR RIVET & STUD COMPANY

QUINCY 70, MASSACHUSETTS • TRS SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago • Cleveland Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York • Philadelphia • Pittsfield • Quincy St. Louis • Seattle. MIDWEST FACILITIES AND STOCK IN CHICAGO. See "Yellow Pages" for phone numbers.

If it's a Tubular Rivet TRS makes it . . . and Better

Forecast for . . .

Stainless Steel Distribution — 1967

HERE'S what to expect for stainless steel in 1967:

- Shipments will be 1,112,750 net tons—87 per cent greater than they were in 1957.
- All consuming groups will take more stainless, but the biggest gains (tonnagewise) will be in automotive, construction and contractors' products, and general purpose industrial equipment—and they will be the top three markets (in that order).
- One-third of all stainless will go through service centers.
- The Detroit area will continue to be the leading consumption area, with New York second, and Chicago third. However, Detroit's share will be down because of the increase in auto manufacturing in other areas.
- Cold rolled strip will be the leading form; cold rolled sheets will be second.

Those predictions were made today at the 44th national conference

Top Ten Consuming Areas

	Net Tons 1957	Net Tons 1967	Increase, Percentage
Detroit	58,213	80,924	39
New York	43,717	76,356	75
Chicago	42,584	75,356	77
Cleveland	26,006	43,200	66
Los Angeles	24,800	56,818	128
Philadelphia	21,254	34,432	62
Boston	13,922	26,574	91
Hartford, Conn.	12,806	21,538	68
Cincinnati	10,535	20,685	96
Buffalo	10,213	14,246	39

Top Ten Market Groups

Market Group	Ranking 1957	Ranking 1967	Percentage of 1967 Total
Automotive Industry	1	1	16.2
Construction & Contractors' Products	2	2	9.8
General Purpose Industrial Equipment	6	3	9.6
Other Domestic & Commercial Equipment	4	4	7.8
Appliances, Utensils & Cutlery	5	5	6.9
Aircraft	3	6	6.0
Other Special Industrial Equipment	8	7	5.5
Metalworking Equipment	7	8	4.7
Food Processing Equipment	9	9	3.9
Electrical Machinery & Equipment	10	10	3.4

Ten Leading Forms

	Ranking 1957	Ranking 1967	Percentage of 1967 Total
Cold Rolled Strip	1	1	30.6
Cold Rolled Sheets	2	2	22.5
Cold Finished Bars	3	3	10.6
Hot Rolled Bars	4	4	9.3
Plates	6	5	6.6
All Other Forms	5	6	5.6
Drawn Wire	7	7	5.2
Pressure Tubing	9	8	4.5
Hot Rolled Sheets	8	9	3.6
Mechanical Tubing	11	10	0.8

Pattern of Stainless Shipments

(Net tons)

Market Classification	DIRECT MILL 1957	DIRECT MILL 1967	SERVICE CENTER 1957	SERVICE CENTER 1967	TOTAL 1957	TOTAL 1967
Conversion & Forgings (except automotive), Net Amount	67,456	68,194	12,669	12,806	80,125	81,000
Bolts, Nuts, Rivets, Screws	8,193	21,360	14,782	38,540	22,975	59,900
Construction, Contractors' Products	21,983	45,938	29,983	62,662	51,966	108,600
Automotive	106,303	174,250	4,545	7,450	110,848	181,700
Rail Transportation	1,987	2,063	903	937	2,890	3,000
Shipbuilding & Marine Equipment	2,342	4,491	6,001	11,509	8,343	16,000
Aircraft	25,815	40,515	16,809	26,385	42,624	66,900
Oil & Gas Drilling	812	1,224	913	1,376	1,725	2,600
Mining, Quarrying, Lumbering	522	711	652	889	1,174	1,600
Agricultural	621	1,194	456	946	1,077	2,140
General Purpose Industrial Equipment	17,790	52,188	18,309	53,712	36,099	105,900
Chemical Industry Equipment	3,634	5,554	9,453	14,446	13,087	20,000
Construction & Related Equipment	494	1,611	325	1,059	819	2,670
Food Processing Equipment	7,125	15,278	12,929	27,722	20,054	43,000
Metalworking Equipment	10,238	23,605	12,400	28,595	22,638	52,200
Pulp & Paper Equipment	831	1,602	3,060	5,898	3,891	7,500
Textile Equipment	713	826	6,626	7,674	7,339	8,500
Other Special Industrial Equipment	9,733	28,225	11,510	33,375	21,243	61,600
Tractors	46	59	32	41	78	100
Hand Tools	295	366	187	234	482	600
Electrical Machinery & Equipment	13,391	27,550	5,080	10,450	18,471	38,000
Appliances, Utensils, Cutlery	34,610	68,820	4,014	7,980	38,624	76,800
Other Domestic & Commercial Equipment	14,148	28,995	28,057	57,505	42,205	86,500
Containers	1,739	2,777	1,392	2,223	3,131	5,000
Ordnance	2,404	2,407	3,788	3,793	6,192	6,200
Nonreporting	33,975	74,740	.....	.....	33,975	74,740
Service Centers	206,284	419,557	.....	.....	.....	.....
Total Domestic	593,484	1,114,100	204,875	418,207	592,075	1,112,750
Export	26,271	25,650	1,409	1,350	27,680	27,000
Grand Total	619,755	1,139,750	206,284	419,557	619,755	1,139,750

Source: International Nickel Co. Inc.

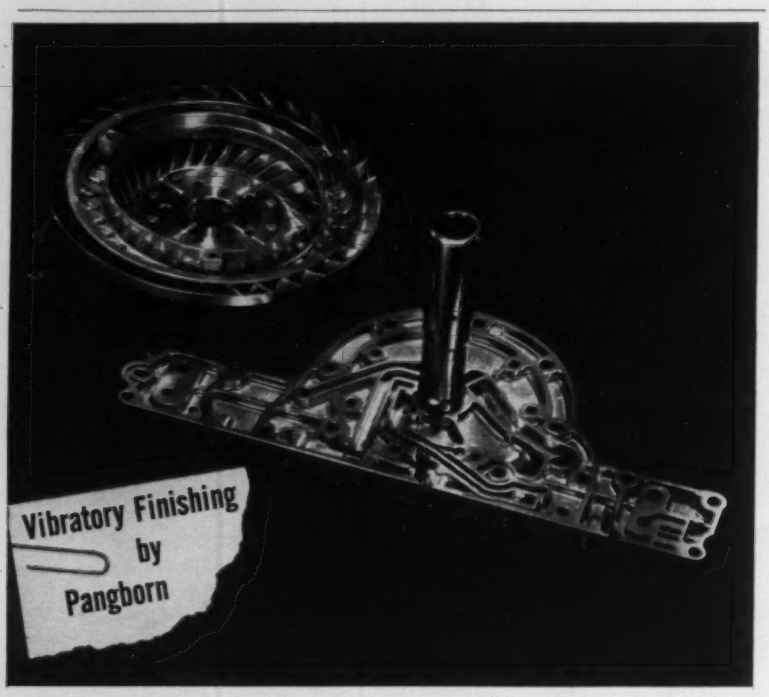
of the American Marketing Association in Los Angeles. The speaker: C. M. Schwitter, market research manager, International Nickel Co. Inc., New York.

The predictions came from a market study Inco made to measure the future demand for nickel and to develop market data that would assist mills and service centers in promoting and selling stainless. (Nickel is used in about 70 per cent of all stainless steel, and stainless is the largest single market for it.)

In making its study, Inco chose ten-year intervals for comparison—1947, 1957, and 1967. (In the first of those decades, stainless sales doubled.)

Mr. Schwitter emphasized that in making the estimates it was not considered possible to take into account any large scale technological changes within an industry. The study is based on patterns of growth and change already at work and an assumption that there will be no significant shift in direction.

The study was possible only with the help of modern computer techniques, Mr. Schwitter explained.



Suddenly complex finishing has a simple solution!

The Pangborn Vibratory Finishing Machine has an unusually wide range of application. What would you like to descale, deburr, radius, finish or burnish?

Metal and metal alloy as well as many plastic and ceramic parts may be vibratory finished. This machine processes extremely small and delicate items with the same facility it handles large and heavy objects.

What's more, the Pangborn Vibratory Finishing Machine performs as much as 100 times faster than conventional equipment. Cuts costs? You bet!

All sizes of the machine come equipped with variable speeds and amplitudes plus new improved air-cushioned suspension. Optional air-cushioned floor mounts completely eliminate any transmission of vibration to the floor. Auxiliary equipment and the best in media and compounds are available for your every need. Send parts with exact finish specifications or finished specimen for sample processing in our laboratory to Mr. William E. Brandt at:

PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada Ltd. 47 Shaft Rd., Toronto (Rexdale). Canada — *Manufacturers of Vibratory Finishing, Blast Cleaning, Dust Control Equipment — Rotoblast® Steel Shot and Grit®.*

Pangborn
OF HAGERSTOWN

Stainless Steel . . .

Stainless Steel Prices, Page 139

Following action by Armco Steel Corp. early this month, U. S. Steel has reduced extra charges on some major types of stainless steel sheets. Armco had reduced gage and width extras on its standard quality sheets in widths 48 in. and under by ½ to 3¼ cents per pound, depending on width and gage. The change, effective June 5, was in addition to a reduction of 1¼ to 4 cents a pound on certain grades of cold rolled stainless strip, first announced by Allegheny Ludlum Steel Corp. May 29.

U. S. Steel Withdraws Its Published Rebar Prices

Withdrawal by U. S. Steel Corp. of its published prices on reinforcing steel bars last week gave rise to uncertainty about price trend.

The corporation announced it will quote prices only in response to specific inquiries. What action other producers will take remains to be seen, though Bethlehem Steel Co., largest producer of rebars, indicated it planned no change in its pricing policy.

Action of U. S. Steel is attributed to extreme competition for orders, which, it's suspected, has given rise to a quiet price shading of as much as $4.50 a ton on the part of some smaller sellers. One steelmaker reported he had heard some domestic mills were delivering rebars at $5.45 to $5.50 per 100 lb against published price of $5.675, plus extras and freight.

Imported rebars are reported selling as much as 25 to 30 per cent below the domestic market in some areas.

Steel Bars . . .

Bar Prices, Page 133

While a diversity of demand is reported by producers, hot rolled carbon bars are only moderately active, and aggregate bookings are not large. Specifications from converters, fastener makers, and distributors continue to be on the low side, and with the summer vacation curtailments ahead, no early improvement is in prospect.

An encouraging development:

Buying of bars for small arms production has been relatively heavy in New England during the first half, and new contracts approximating $15 million assure active demand in the weeks immediately ahead. Participating are: Saco Lowell Shops, Saco, Maine, machine guns; Harrington & Richardson Inc., Worcester, Mass., rifles; Storms Drop Forging Co., Springfield, Mass., barrel blanks. Some tooling was required during the first half, and bar buying the rest of this year will be heavier.

In general, cold finished bar shipment promises run two to four weeks, depending on mill rolling schedules. Where hot stock is readily available, some mills can give quicker shipments.

A rising market for high quality, steel bar stock in large size coils has led U. S. Steel Corp. to replace its 10 in., No. 4 bar mill with a new, 12 in. mill at its Gary Steel Works. The mill is producing rounds in coils and cut lengths ½ to 1¼ in. in diameter. Carbon bar flats, automotive alloy spring steel flats, and carbon steel concrete reinforcing bars are also available. The mill will produce a full range of quality bars, including cold drawing, cold heading, and cold extrusion types.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 134 & 135

Sheets continue to move at a fairly fast pace, though automotive demand is slowing. Appliance requirements are heavier, but they are less than had been predicted. Cold weather earlier this month and in May held down sales to air conditioner makers.

In general, there continues to be a fairly wide diversity of needs before the market. June orders are expected to equal May's, but July tonnage will be off noticeably. Here and there reports are heard that some metalworking plants are considering closing down for three weeks instead of the usual two for vacations because business is slow.

Shipments of hot rolled sheets still range two to three weeks and on cold rolled two to five weeks. Some galvanized sheet makers can still work in a little additional tonnage for July shipment, but most mills can't offer much before August. One large maker can't promise delivery until late August.

Inland Steel Starts up Its New Galvanizing Line

Inland Steel Co.'s fourth continuous galvanizing line at the Indiana Harbor Works went into production June 1. The first Ti-Co sheets made were shipped to Central Steel & Wire Co., an Inland warehouse customer in Chicago. Other shipments were made to Ryerson warehouses in Chicago, Dallas, and Spokane, and to other Inland customers in Los Angeles, Phoenix, Ariz., and Peoria, Ill.

In 1954, with completion of its No. 2 continuous line and abandonment of production by the old hot dip process, Inland became the first steel company to produce all its sheets by the continuous hot dip process. Now, with addition of the No. 4 line, the Indiana Harbor Works becomes a contender for the title of world's largest, single plant

Put your foot down on SHEARING COSTS

Lodge & Shipley 24" SPEED SHEAR

The Lodge & Shipley 24" Speed Shear is so quick you'll be saving money from the first stroke it makes in your plant. From installation . . . through set-up and maintenance . . . to actual shearing speed of 120 strokes per minute, it really lives up to its name!

Uniquely designed for straight shearing (with back gauge), angle shearing, sequential shearing, slitting, notching, blanking and duplicating straight-side parts without dies, the Speed Shear offers unequalled speed, versatility and convenience.

Whether it's your only shear or used to release a big, slow shear from small shearing jobs, the Speed Shear can cut shearing costs in your plant. Want more facts? Write: The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.

IN SHEARS, TOO . . .
YOUR LODGE-ICAL CHOICE

Lodge & Shipley

producer of continuous hot dipped galvanized sheets.

The new No. 4 line makes it possible for Inland to enter the new and developing market for aluminized sheets. The line is equipped for coating of sheets with aluminum instead of zinc. But the peak of the season for galvanized sheets is at hand, and the facility is expected to be kept busy with that product.

The No. 4 line, while similar to No. 3, includes several refinements. It can produce coils up to 6 ft in diameter compared with the previous maximum of 5 ft. Other improvements include coil feeders on the entry end which eliminate hand feeding of the coil into the line, a conveyor type, smelter feeding installation which will feed ingots of zinc into the line's pot, a Voss leveler paired with two powerful bridle rolls which can stretch the strip to improve flatness, and a mash seam-welder, which produces a flatter weld between coils.

Distributors . . .

Prices, Page 140

June orders are coming out in a little better volume than was the case in May. The improvement is particularly noticeable in structurals, especially flange sections. Distributors say demand is bolstered by buying for maintenance and repair programs that will be undertaken while plants are down for mass vacations.

In the Birmingham district, a shortage of plates in some sizes is reported.

Service Center Stocks Go Up 50,000 Tons in May

Steel service centers have been increasing their inventories the last couple of months. At the start of June, it was estimated they were holding about 2,950,000 net tons of finished steel products, up 50,000 from the preceding month.

The June inventory compares with the record 3.8 million tons held last summer and with a normal stock figure of 3.4 million.

The rise in inventories is said to reflect the slight improvement in warehouse order volume in recent months. Distributors have been ordering more actively from the mills in line with the greater call on them for supplies by their customers.

Average service center order size is estimated currently at 800 lb, up about 100 lb from earlier this year, but substantially under the 1200 lb per order averaged early in 1960.

Pig Iron . . .

Pig Iron Prices, Page 140

Merchant pig iron buying is sluggish seasonally. A further decline in demand is expected over the next few weeks as foundries shut down for annual vacations.

In some districts, however, the outlook is more promising. Good export and domestic buying is reported in the Buffalo district. A major producer of merchant iron in the district is planning to resume production soon.

Structural Shapes . . .

Structural Shape Prices, Page 133

Considerable structural work is being figured, but orders continue spotty, and fabricators report no particular change in backlogs. In fact, they are disappointed with order volume; some shops report backlogs are below normal, running only 60 to 90 days.

Fabricating shops are holding their steel purchases pretty much in line with their requirements, doing relatively little forward buying. The fact that mill shipments run only two to four weeks encourages limited forward coverage. Often, however, mill shipments extend beyond the promised delivery date, and when that happens, fabricators are hard pressed to maintain fabricating schedules.

The chief complaint of fabricators concerns price competition. That is particularly true of bids on public jobs, such as schools and similar structures, which make up the bulk of order volume at some points.

There's relatively little new road work developing, and only a few

Iron Ore Statistics—April, 1961

Iron Ore in Inventory—Original Sources
(Gross tons)

	U. S. Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
Apr. 1, 1961						
At furnaces	29,930,423	3,384,978	1,424,197	3,762,232	17,328,947	55,830,777
At Month's end:						
Mass., N. Y.	2,392,120	16,886	19,284	137,396	341,135	2,906,821
Pennsylvania	6,051,829	405,675	25,686	112,184	8,105,088	14,700,462
Md., Va., W. Va.	279,914	8,060	.....	1,153,083	2,946,404	4,387,461
Ky., Tenn., Tex.	200,807	175,434	.....	177,838	95,362	649,441
Alabama	872	1,755,165	.....	116,454	3,743,092	5,615,583
Ohio	7,332,077	20,524	655,624	1,492,050	1,281,376	10,781,651
Indiana	4,934,555	28,578	260,670	6,452	78,265	5,308,520
Illinois	3,269,371	66,120	35,824	.....	241,435	3,612,750
Mich., Minn.	2,099,709	.....	207,155	55,022	305,852	2,667,738
Colo., Utah, Calif.	.....	832,395	.....	.....	7,412	839,807
Undistributed	543	2,407	.....	.....	757	3,707
End of month:	26,561,797	3,311,244	1,204,243	3,250,479	17,146,178	51,473,941
At U. S. Docks	2,818,800	.....	215,327	891,898	2,460,392	6,386,417
Total U. S.	29,380,597	3,311,244	1,419,570	4,142,377	19,606,570	57,860,358
In Canada	1,463,601	.....	106,207	230,352	77,275	1,877,613
Total U. S. and Canada	30,844,198	3,311,244	1,525,955	4,372,729	19,683,845	59,737,971

Iron Ore Consumption—April, 1961
(Gross tons)

	U. S. Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
In U. S.:						
Mass., N. Y.	297,074	8,523	25,204	19,609	10,219	360,629
Pennsylvania	680,413	233,536	1,054	42,678	724,083	1,681,764
Md., W. Va., Va.	113,628	17,402	.....	309,329	331,156	771,515
Ky., Tenn., Tex.	42,113	72,162	.....	49,915	36,916	201,106
Alabama	.....	294,887	.....	3,737	142,764	441,388
Ohio	683,601	6,252	62,554	103,912	114,433	970,752
Indiana	965,312	.....	72,031	.....	38,929	1,076,272
Illinois	444,502	9,947	7,610	.....	19,531	481,590
Mich., Minn.	376,854	.....	51,502	28,511	58,537	515,404
Colo., Utah, Calif.	.....	593,860	.....	.....	17,911	611,771
Undistributed	98	36	.....	.....	179	313
In U. S.:						
Blast furnaces	2,352,571	811,282	117,217	211,812	475,932	3,968,814
Steel furnaces	106,751	44,862	796	16,792	360,452	529,653
Sintering	1,144,267	380,461	101,774	329,087	657,936	2,613,525
Miscellaneous	6	.....	168	.....	338	512
Total U. S.	3,603,595	1,236,605	219,955	557,691	1,494,658	7,112,504
In Canada:						
Blast furnaces	275,430	.....	78,882	109,714	.....	464,026
Steel furnaces	.....	.....	.....	19,712	6,262	25,974
Sintering	72,915	.....	3,776	25,901	.....	102,592
Miscellaneous	.....	.....	.....	.....	.....	.....
Total Canada	348,345	.....	82,658	155,327	6,262	592,592
Total U. S. and Canada	3,951,940	1,236,605	302,613	713,018	1,500,920	7,705,096

Data from American Iron Ore Association.

industrial jobs are pending—they mostly involve plant alterations requiring relatively small tonnages.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3605 tons, state highway work, FIDE 61-1, Kings County, New York, through Johnson, Drake & Piper, general contractor, New York, to the Ernst Iron Works, Buffalo, and J. K. Welding Co., New York.

3000 tons, Mary Simphovitch Houses, New York; project went reinforced concrete; Joseph P. Blitz, New York, is general contractor.

1100 tons, Underseas Warfare Research building, Ft. Trumbull, New London, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Psaty & Fuhrman Inc., New York, general contractor.

500 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia; bids June 23.

395 tons, high school, Wantagh, Long Island, N. Y., to the Wander Iron Works, Brooklyn, N. Y.

235 tons, joists, junior high school, Wissahickon, Montgomery County, Pennsylvania, to Truscon Steel Div., Republic Steel Corp., Cleveland.

150 tons, WBAL television station, Baltimore, to Keystone Structural Steel Co., Trenton, N. J.

130 tons, bridge, Washington, through McCloskey & Co., Philadelphia, general contractor, to Atlas Machine & Iron Works, Huntington, W. Va.

100 tons, special products building, General Electric Co., Warren, Mich., to the Republic Structural Iron Works, Cleveland.

STRUCTURAL STEEL PENDING

5000 tons, University Teaching Hospital, Syracuse, N. Y., low on general contract, Malan Construction Co., New York.

4000 tons, Administration Center, Moline, Ill., bids June 20.

3000 tons, Forsyth General Hospital, Winston-Salem, N. C., bids July 6.

1665 tons, service center, American Red Cross, New York, Skidmore, Owings & Merrill, agents.

1582 tons, state bridgework, Route 80, Sec. 5N, Bergen County, New Jersey, readvertised for June 29; also, 521 tons of reinforcing bars.

1485 tons, reconstruction, Sixth Avenue subway, between 19th and 21st Streets, New York, Johnson, Drake & Piper and Cayuga Construction Co., low on a joint bid for the general contract.

1200 tons, state office building, Buffalo, John W. Cowper, that city, low on general contract.

1135 tons, 71 transmission towers, Public Service Electric & Gas Co., Caldwell and Clinton, N. J., pending.

983 tons, four span, composite, wide flange beam bridge, South Burlington, Vt., 1-89-3 (12) Interstate Route 89; E. T. O'Neill & Son Construction Corp., Westfield, Mass., low on general contract; also, 152 tons of concrete reinforcing bars, and 8540 linear feet of steel piles.

920 tons, Nazareth High School, Brooklyn, N. Y., Tweedy Engineering Co., low on general contract.

900 tons, addition, Robert Treat Hotel, Newark, N. J., George F. Driscoll Co., low on general contract.

835 tons, Brooklyn-Queens Expressway, Queens County, New York, bids closed June 13.

750 tons, boiler supports, Utah Power & Light Co., Kemmerer, Wyo., Combustion Engineering Inc., New York, general contractor.

700 tons, state office building No. 12, Albany, N. Y., bids closed June 14; project was previously noted as involving 15,000 tons.

690 tons, Princeton Club, 43rd Street, New York, Iron & Reynolds, that city, general contractor.

650 tons, ocean cable building, Western Electric Co., Baltimore, bids closed June 13.

634 tons, three contracts for angles, Military Industrial Supply Agency, Navy, Philadelphia, bids June 27; also, 144 tons of carbon steel strip, same date.

600 tons, manufacturing plant, International Paper Co., near Pittsburgh, bids closed.

500 tons, apparatus service shop, General Electric Co., Cuyahoga Heights, Ohio, bids closed June 8.

500 tons, one story garage extension, New York, Gotham Construction Co., that city, low on general contract.

450 tons, executive terrace apartments, Elizabeth, N. J., Robert Chuckrow Construction Co., general contractor.

372 tons, three, wide flange beam bridges, South Burlington, Vt., I-89-3 (14) Interstate Route 89; W. H. Hinman Inc., Westbrooke, Maine, low on general contract; also, 206 tons of concrete reinforcing bars, and 3600 linear feet of steel piles.

350 tons, fieldhouse, Princeton University, Princeton, N. J., bids closed.

300 tons, air traffic control center, McArthur Field, Islip, N. Y., bids July 11.

300 tons, keg handling building, Liebmann Breweries Inc., Brooklyn, N. Y., bids closed.

160 tons, state highway, No. 105, lock gate, Oneida County, New York, bids June 22.

155 tons, state bridgework, FARC 61-93, Sullivan and Ulster counties, New York, bids June 22.

145 tons, state bridgework, Huntingdon County, Pennsylvania, bids June 30.

100 tons, radar tower, Cut Bank, Mont.; bids to U. S. Engineer, Seattle, July 11.

100 tons, radar tower and buildings, Sparrevohn Air Base, Alaska; general contract to Pacific General Construction Co. and American Service Co., Seattle, joint low bidders at $278,754.

REINFORCING BARS . . .

REINFORCING BARS PLACED

100 tons, commercial and industrial building, Seattle Century 21 Exposition, to Pacific Coast Div., Seattle, Bethlehem Steel Co.; Sound Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

820 tons, Spring Creek debris dam, Trinity River, California; Gibbons & Reed, Salt Lake City, Utah, low at $3,196,387 to the U. S. Bureau of Reclamation, Lewiston, Calif.

521 tons, state bridgework, Route 80, Sec. 5N, Bergen County, New Jersey, readvertised for June 29; also, 1582 ton of structural steel.

412 tons, state bridge work, Union-Northumberland counties, Pennsylvania, bids June 30.

235 tons, 458 Rouge River bridge, Curry County, Oregon; bids to the Bureau of Public Roads, Portland, Oreg., June 29.

215 tons, Rouge River bridge, Josephine County, Oregon; bids to the Bureau of Public Roads, Portland, Oreg., June 28.

175 tons, Washington State traffic exchange, Longview, Wash.; General Construction Co., Portland, Oreg., low bidder at $515,788.

160 tons, Washington State highway spans, Grays Harbor County; Thomas Scalzo Co., Seattle, general contractor at $807,462.

100 tons, including pipe and miscellaneous, first stage of south shore John Day Dam, Washington State; Halvorson, McLaughlin & Associates, low at $753,138 to the U. S. Engineer, Walla Walla, Wash.

100 tons, also miscellaneous steel pipe, Idaho State underpass, Kootenai County; bids to Boise, Idaho, June 20.

RAILS, CARS . . .

LOCOMOTIVES PLACED

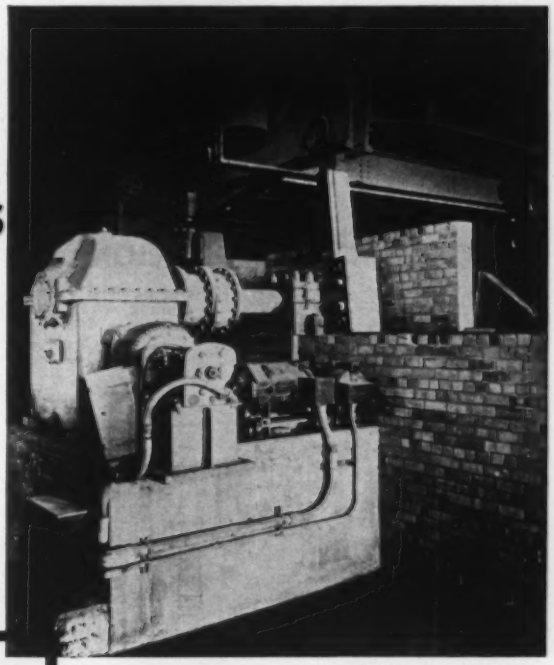
Norfolk & Western, 30 diesel units, 24 to Electro-Motive Div., La Grange, Ill., General Motors Corp., and six to Alco Products Inc., Schenectady, N. Y.

RAILROAD CARS PLACED

Union Pacific, 1100 freight cars to own shops at Omaha, Nebr. The list comprises 900, fifty ton boxcars and 200, 70 ton insulated boxcars.

Norfolk & Western, 50, seventy ton covered hopper cars to the Pullman-Standard Div.,

Tilting 700-tons of steel furnace



CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

Pullman Inc., Chicago.
Phillips Petroleum Co., five hundred, 30,300 gallon tankcars to General American Transportation Corp., Chicago.

RAILROAD CARS PENDING

New York City Transit Authority, 220 subway cars for service on the Interborough Rapid Transit, bids asked.
Pakistan Ministry of Railways & Communications, 475, broad gage freight cars, bids, July 3.

PIPE . . .

CAST IRON PIPE PLACED

112 tons, 8 and 12 in., Tukwila, Wash., to Pacific States Cast Iron Pipe Co., Seattle.
88 tons, 4 and 6 in., Aberdeen, Wash., to Pacific States Cast Iron Pipe Co., Seattle.
88 tons, 6 to 12 in., Port of Seattle, airport project, to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

63 tons, 4 and 6 in., for Port Angeles, Wash., bids June 15; 24 tons of 8 in. for Seattle, bids June 14.

PLATES . . .

PLATES PLACED

485 tons, hull plates, Military Industrial Supply Agency, Navy, Philadelphia, to Delaware Valley Steel Co. Inc., Upper Darby, Pa.

PLATES PENDING

800 tons, kiln shell, Taylor Engineering Co., Beaumont, Tex.
350 tons, resurfacing Hackensack River bridge, Secaucus, N. J., Franklin Contracting Co., low on general contract.

Ingot Output Holds Fairly Steady

STEELMAKING operations apparently are leveling off close to a 2 million ton weekly rate. Some ingot producers, anticipating the usual seasonal slowdown at consuming plants, are curtailing schedules; others, maintaining substantial order backlogs, are boosting production. STEEL estimates output for the week ended June 17 at 2,030,000 tons, a decline of only 0.6 per cent from the 2,042,000 tons for the preceding week.

● **Youngstown** — Production was scheduled at about 52 per cent of the 1960 capacity for the week ended June 17, a drop of 2 points from the preceding week's rate. Youngstown Sheet & Tube Co. took off two open hearths while Sharon Steel Corp. took off one open hearth at its Roemer Works, Farrel, Pa.

● **Pittsburgh**—U. S. Steel Corp. relighted an open hearth at its Homestead District Works, Munhall, Pa., placing in operation all 11 units in the newer and more efficient of the mill's two furnace batteries. Another open hearth shop at Homestead containing 14 older and smaller furnaces has been closed for more than a year.

● **Chicago**—Steelmaking operations improved slightly in the week ended June 17 with the rate estimated at 78 per cent of 1960 capacity. U. S. Steel reactivated its No. 4 open hearth shop of 12 furnaces at its Gary (Ind). Works which had been idle for a year. By the end of the week, 44 of 53 open hearths at Gary were scheduled to be active.

● **Buffalo**—Steel ingot production declined further during the week ended June 10 as a result of shutting down of two open hearths at the Lackawanna, N. Y., plant of Bethlehem Steel Co. The company is using 17 of its 35 open hearths at that mill.

● **Philadelphia**—Reflecting seasonal influences, a decline of 2 points in the AISI index in the Northeastern District is estimated by STEEL for the week ended June 17.

● **Birmingham** — The steelmaking rate for the Southern District rose to about 77 per cent of 1960 capacity. The rise was due mainly to an increase in operations at the mills of Tennessee Coal & Iron Div., U. S. Steel Corp.

● **Detroit**—Production was scheduled to move higher during the week ended June 17 as one producer placed another furnace on the active list. Continued automotive orders indicate steel production will stay close to current levels through July.

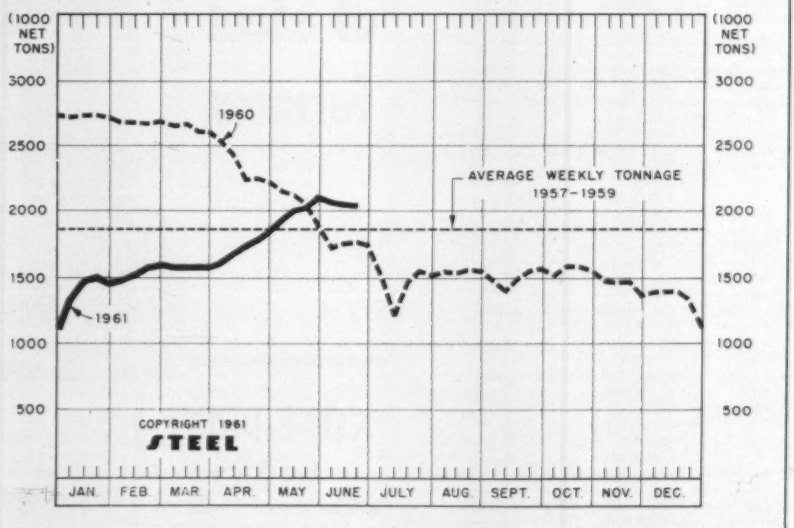
● **Los Angeles**—The Western District operating rate rose 4 points to an estimated 80.7 per cent of 1960 capacity for the week ended June 17. Kaiser Steel Corp. and Colorado Fuel & Iron Corp. were among producers increasing production schedules.

STEEL INGOT PRODUCTION

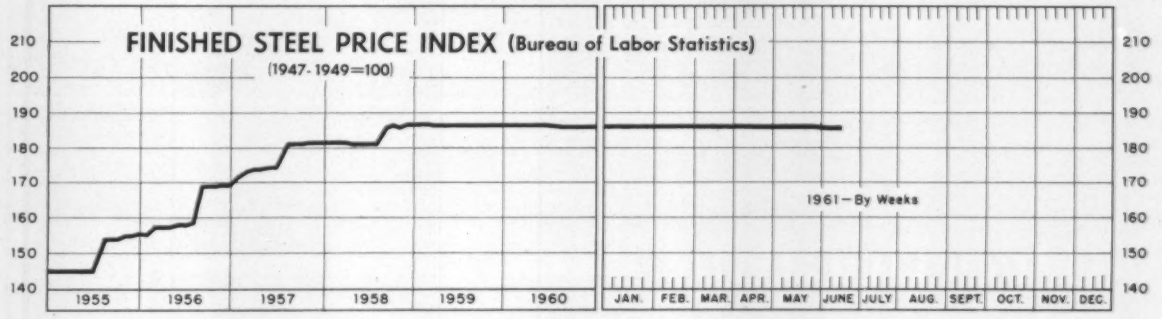
Weeks Ended	Net Tons	Change
June 17	2,030,000*	— 0.6%
June 10	2,042,000	— 0.5%
June 3	2,052,000	— 1.2%
Totals to June 10		
1961	39,183,000	—29.2%
1960	55,362,000	

DISTRICTS	Week Ended —June 10— Tons‡	Index†	Week Ended June 3 Index†
Northeastern	272,540	102	104
Buffalo	105,143	108	119
Pittsburgh	383,372	95	95
Youngstown	169,981	100	104
Cleveland	116,670	126	125
Detroit	144,785	138	139
Chicago	430,187	115	115
Cincinnati	91,994	122	114
St. Louis	62,535	119	125
Southern	120,320	111	106
Western	144,972	124	119
Industry	2,042,000	109.6	110.1

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



June 13, 1961	Week Ago	Month Ago	May Index	Year Ago
185.5	185.6	186.1	186.1	186.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 13

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.650
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.460
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	193.040
Casing, Oil Well, Alloy (100 ft)	302.603
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	June 14 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

	June 14 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.98
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	60.27
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.80
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.27
Steelmaking Scrap, GT	38.50	38.50	36.33	31.33	46.00

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	June 14 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, ⅞-⅝" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton

	June 14 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$61.00
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	215.00

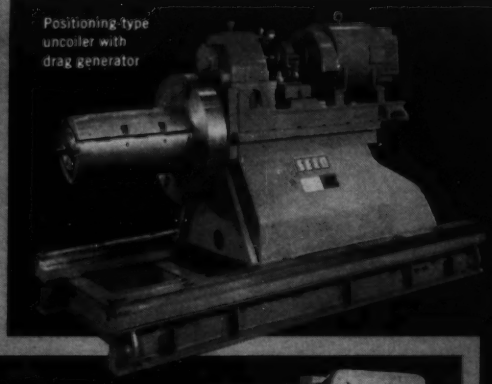
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$36.00	$37.50	$34.50	$30.50	$44.50
No. 1 Heavy Melt, E. Pa.	39.50	39.50	39.00	34.00	47.50
No. 1 Heavy Melt, Chicago	38.50	38.50	35.50	29.50	46.00
No. 1 Heavy Melt, Valley	38.50	38.50	37.50	32.50	49.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	34.50	31.50	47.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	30.50	45.50
Rails, Rerolling, Chicago	58.50	58.50	57.50	49.50	69.50
No. 1 Cast, Chicago	43.50	43.50	41.50	42.50	45.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50



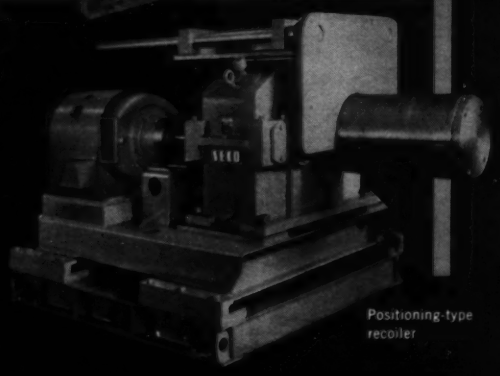
Positioning-type uncoiler with drag generator

Predictable Performance

for processing lines with

SECO

terminal equipment



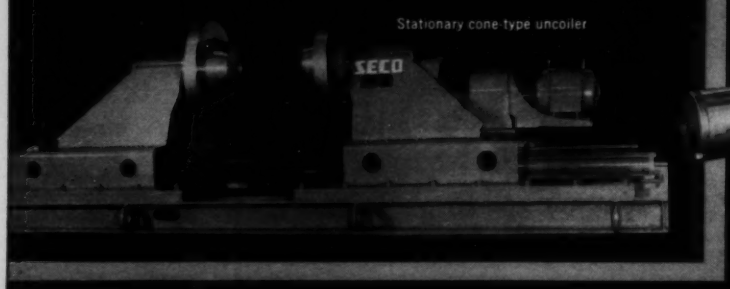
Positioning-type recoiler

From entry to exit, new and modernized processing lines . . . annealing, pickling and others . . . perform better with SECO terminal equipment. This equipment handles coils ranging from 10,000 to 50,000 pounds with speed, convenience, safety.

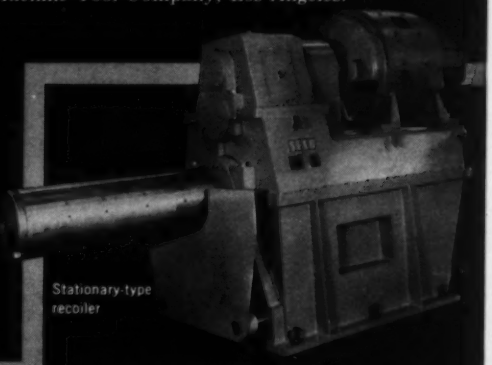
SECO uncoilers and recoilers are designed to operate at any speed the mill requires, are available in positioning or stationary types. The positioning types feature a slideable reel base mounted on a sub-base for alignment with the processing line, actuated by an automatic edge control.

SECO also makes auxiliary equipment such as coil cars with coil lifts to simplify uncoiler loading and recoiler unloading. Available for mandrel or cone-type reels.

A staff of trained sales engineers will assist you in finding the equipment best suited to your needs. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles.



Stationary cone-type uncoiler



Stationary-type recoiler

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

Affiliated with Lee Wilson Engineering Co., Inc.

Steel Prices

Mill prices as reported to STEEL, June 14, cents per pound exexcept as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 134; footnotes, page 136.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOT, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. C8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 .99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary, Ind. U5 .....122.50
S.Chicago,Ill. R2,W14..122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ...6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 .6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixvill,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 .5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2 .5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 .8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbo,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Claymont,Del. P4 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ...6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ....5.675
Seattle(9) A24,B3,N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra) Carbon
LosAngeles P2, S30...11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, H5, P17 ....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.25
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025

Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.00
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex. (26) T4 ..5.50
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.425
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Youngstown R2 .....5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
SandSprings,Okla. S5 ..7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33

St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H. R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaClay,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ....7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	*7.225*	
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, ENAMELING

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N5 Nelsen Steel & Wire Co. Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.
V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 .....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1 .5.10
Johnstown, Pa. (25) B2 ..5.10
Lackaw'na, N.Y. (25) B2 .5.10
Los Angeles (25) B3 .....5.85
Los Angeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
San Francisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 ....5.10
S. San Francisco (25) B3 ...5.85
Sparrows Point, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W. Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
Kansas City, Mo. S5 .....8.65
Los Angeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 .....8.40
S. Chicago, Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 .....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1 .7.575
Lackawanna, N.Y. B2 ..7.575
Los Angeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 ....7.575
S. San Francisco (25) B3 .8.325
Sparrows Point, Md. B2 .7.575
Warren, O. R2 .....7.575
Weirton, W. Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn, Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 .....7.425
Farrell, Pa. S3 .....7.425
Follansbee, W. Va. W10 .7.425
Fontana, Calif. K1 .....9.20
Franklin Park, Ill. T6 ...7.425
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
Los Angeles C1, S41 .....9.30
McKeesport, Pa. E10 ....7.525
New Bedford, Mass. R10 .7.875
New Britain, Conn. S15 .7.875
New Castle, Pa. B4, M23 .7.425
New Haven, Conn. D2 ...7.875
New Kensington, Pa. A6 .7.425
Pawtucket, R.I. R3, N8 .7.975
Philadelphia P24 .....7.875
Riverdale, Ill. A1 .....7.425
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ...8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie, Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
Franklin Park, Ill. T6 ..15.55
Harrison, N.J. S18 .....15.55
Indianapolis S41 .....15.70
Los Angeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. S8 .....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W. Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
Franklin Park, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	....
Los Angeles S41	11.15	12.60	14.80	....	....
New Britain, Conn. S15	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
New Haven, Conn. D2	9.40	10.70	12.90	15.90	....
New Kensington, Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria, O. S1	...	...	19.05	22.15	....
Franklin Park, Ill. T6	...	...	19.20	23.30	28.15
Harrison, N.J. C18	...	...	18.85	22.95	27.80
New York W3	...	...	18.85	22.95	27.80
Palmer, Mass. W12	...	...	18.85	....	....
Trenton, N.J. R5	...	...	18.85	22.95	27.80
Worcester, Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 .....7.525*
McKeesport, Pa. E10 ..7.50*
New Castle, Pa. M23 ..7.425*
Riverdale, Ill. A1 .....7.525*
Warren, O. B9, S3, T5 .7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.10	9.35	9.75
Fairless, Pa. U5	9.10	9.35	9.75
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
Granite City, Ill. G4	9.20	9.45	9.85
Indiana Harbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
Sparrows Point, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
Indiana Harbor, Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles, O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box			
Common Coke	45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless, Pa. U5	6.10	6.25	6.40	6.55
Gary, Ind. U5	6.10	6.25	6.40	6.55
Indiana Harbor, Ind. I-2	6.10	6.25	6.40	6.55
Irvin, Pa. U5	6.10	6.25	6.40	6.55
Sparrows Point, Md. B2	6.10	6.25	6.40	6.55
Weirton, W. Va. W6	6.10	6.25	6.40	6.55

Tin Plate, Hot Dipped 1.25 lb Common Coke	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.40	10.65
Fairless, Pa. U5	10.40	10.65
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5 .....$8.20
Fairfield, Ala. T2 .....8.20
Fairless, Pa. U5 .....8.20
Fontana, Calif. K1 .....8.85
Gary, Ind. U5 .....8.20
Granite City, Ill. G4 .....8.30
Ind. Harbor, Ind. I-2, Y1 .8.20
Irvin, Pa. U5 .....8.20
Niles, O. R2 .....8.20
Pittsburg, Calif. C11 ....8.85
Sparrows Point, Md. B2 ..8.20
Weirton, W. Va. W6 ....8.20
Yorkville, O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa, Pa. J5 .....7.85
Gary, Ind. U5 .....7.85
Granite City, Ill. G4 .....7.95
Ind. Harbor, Ind. Y1 ....7.85
Irvin, Pa. U5 .....7.85
Yorkville, O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom, W. Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
Granite City, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
Indiana Harbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield, O. E6	8.10
Vandergrift, Pa. U5	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
Beech Bottom, W. Va. W10	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2 ...8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville, Ind. M8 ..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ....8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
Kansas City, Mo. S5 ....8.25
Kokomo, Ind. C16 .....8.10
Los Angeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16 ..8.00
Palmer, Mass. W12 ....8.30
Pittsburg, Calif. C11 ...8.95
Portsmouth, O. P12 ....8.00
S. Chicago, Ill. R2 .....8.00
S. San Francisco C10 ....8.95
Sparrows Point, Md. B2 ..8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. (10) B2 ..12.65
Kansas City, Mo. U3 ....12.90
Los Angeles (2) B3 .....13.60
Minnequa, Colo. C10 ..12.775
Monessen, Pa. P7, P16 ..12.65
Muncie, Ind. I-7 .....13.60
New Haven, Conn. A7 ...12.95
Palmer, Mass. W12 .....13.70
Pittsburg, Calif. C11 ....13.45
Portsmouth, O. P12 .....12.65
Roebling, N.J. R5 .....12.95
Sparrows Pt., Md. (10) B2 12.75
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
Kansas City, Mo. S5, U3 .10.00
Kokomo, Ind. C16 .....9.85
Los Angeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
New Haven, Conn. A7 ...10.95
Palmer, Mass. W12 .....10.05
Pittsburg, Calif. C11 ...10.075
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. San Francisco C10 ...10.70
Sparrows Pt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
Kansas City, Mo. S5, U3 .10.00
Los Angeles B3 .....10.70
Milbury, Mass. (12) N6 .10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 .....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. San Francisco C10 ...10.70
Sparrows Pt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8 .16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ...16.65
Johnstown, Pa. B2 .....16.30
Kansas City, Mo. S5 ....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 .....16.60
S. San Francisco C10 ....17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J8 .16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S41 .....13.45
Johnstown, Pa. B2 .....13.45
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 .....13.75
Portsmouth, O. P12 .....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
Sparrows Pt., Md. B2 ...13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 ....13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	**12.65**

NAILS, Stock Sizes	**Col.**
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	**175**
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES	**Col.**
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	**173**
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	**173**
Joliet,Ill. A7	173
KansasCity,Mo. S5	**180**
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S. Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler
(14½ Ga.)(per 97 lb net box)
Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.
100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim
100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	**9.21**
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S. Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop	**Col.**
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS	**Col.**
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed	**Col.**
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	**193****
SparrowsPoint,Md. B2	198‡
Sterling,Ill.(7) N15	198

WIRE (16 gage)	**An'ld Stone**	**Galv. Stone**
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	**17.85**	**19.65**
Bartonville K4	17.95	19.80
Chicago W13	17.85	....
Cleveland A7	17.85	....
Craw'sville M8	**17.95**	**19.80‡‡**
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	17.85	19.65‡
Kan.City,Mo. S5	18.10	....
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	**19.10**	**19.70†**
Pitts.,Calif. C11	**18.20**	**19.75†**
S.SanFran. C10	**18.20**	**19.75****
SparrowsPt. B2	**17.95**	**19.75‡**
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	....

WOVEN FENCE, 9-15 Ga. Col.	
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality **6 to 8 gage**	**An'ld**	**Galv.**
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	....
Crawfordsville M8	9.10	9.80††
Donora, Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated. ¼ in. thru 1 in. diam., listed lengths: Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

BOLTS, Standard stock sizes: Plain Finish 50
Hot Galvanized and Zinc Plated:

Packaged	39.25
*Bulk	46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:
¾ in. and smaller, 6 in. and shorter:

Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam., 6 in. and shorter:

Packaged	+ 5
Bulk	19

Through 1 in. diam., longer than 6 in.:

Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.: Plain Finish 50
Hot Galvanized and Zinc Plated:

Packaged	39.25
Bulk	46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES	
Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	**7.025**

JOINT BARS	
Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES	
Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES	
Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated	
Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES	
Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	**10.10**
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in., and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

UNITED®

4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

1901 UEFCO 1961

Progress...Leadership
United for Sixty Years

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

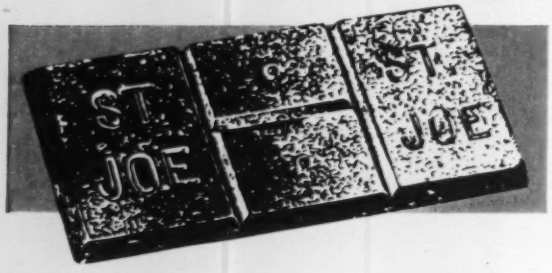
Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

To withstand these extreme corrosive and wear conditions a leading automotive producer manufactures their muffler from a double-thick laminated shell with four *zinc-coated* surfaces. Key baffles and rear pipe are also *zinc-coated*.

This is another example of the protective qualities of zinc galvanizing. Even if the corrosion-defying zinc skin is broken by impact or abrasion, the steel continues to be protected by zinc's galvanic action. The zinc sacrifices itself slowly while saving the base metal from rust.

No other metal or combination of metals can give this assurance of long life, at comparable cost. *Only zinc-coated steel has this combination of strength, formability, corrosion-resistance and economy.*

AND—THE **ZINC** *FOR THE JOB*



St. Joe was the pioneer in the production of "tailor-made" zinc electronically-matched to the requirements of the continuous galvanizing lines and today is the largest supplier of this metal to the steel industry.

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE **NEW YORK 17, N. Y.**

ST. JOE

ZN-199

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.76
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Prooducts; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.60	43.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3 J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.20	9.61	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	10.41	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	11.10	11.77	12.40	10.05	13.35	16.59	10.50	9.85	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.66
Cleveland	9.22	10.66	10.92	11.51	9.54	11.25	16.06	9.96	9.30	11.59
Dallas	10.57	10.66	11.75	12.13	9.98	12.98	16.95	10.21	10.80	13.45
Detroit	9.48	10.46	11.05	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	10.17	10.98	11.35	11.73	9.58	13.10	16.55	9.81	9.90	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.20	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.62	10.60	11.10	11.79	9.62	11.05	16.40	9.97	9.46	11.75
Newark, N. J.	9.36	10.13	11.35	11.46	9.74	13.25	16.40	10.20	9.51	11.06
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.80	10.00	10.89	11.25	9.65	11.95	16.48	9.85	9.60	11.10
Pittsburgh	9.22	10.66	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.36
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.50
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.85	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $1.75.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Pa., $163; E. Chicago, Ind., Joliet, Ill., $168; Cannon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Pa., Wellesville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup, Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Narlo, Ohio, $109.50. Magnesite: Narlo, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettaville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅜ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.00-15.75*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	7.50††
Electrolytic Iron,	Dollars
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron:	
90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 600-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10	55.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	54.70
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.89
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.60	$5.65	$5.55	$5.45	$5.75
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.65	5.70	5.60	5.50	5.80
I-Beams	5.60	5.65	5.55	5.45	5.75
Channels	5.60	5.65	5.55	5.45	5.75
Plates (basic bessemer)	5.55	5.60	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.20	6.15	6.05	5.90	6.25
Merchant Bars	6.15	6.20	6.10	6.00	6.30
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (‡)	7.15	7.20	7.10	7.00	7.30

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier. *Except Boston.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%; C 0.05% max., 32.00c; C 0.10% max., 31.75c; C 0.20% max., 31.50c; C 0.50% max, 31.25c; C 1.0% max., 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C. l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si, Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F. o. b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

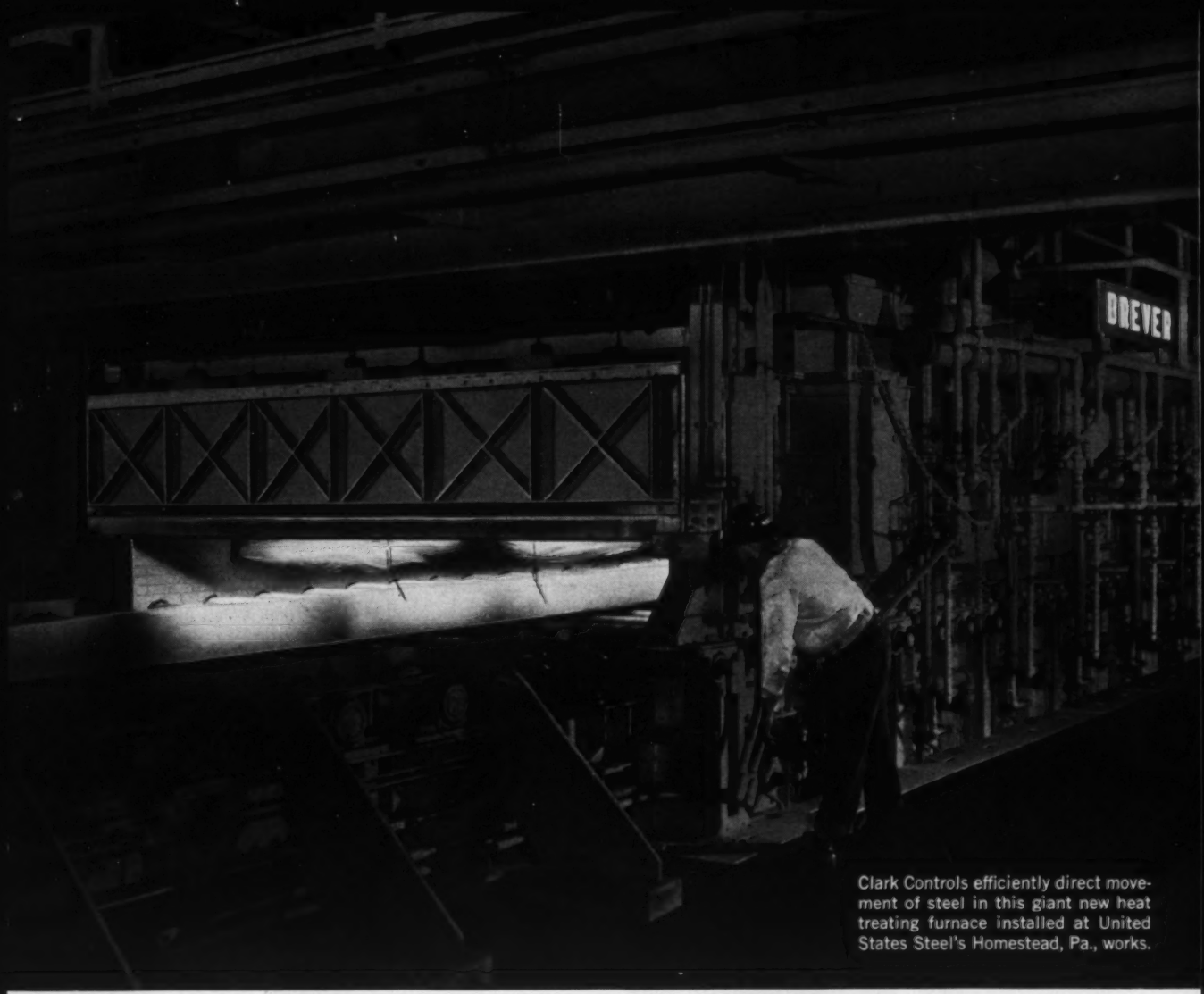
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.



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Scrap Levels Off with Steel Rate

Approaching vacation slump in metalworking checks mill buying, with ingot rate beginning to flatten out. Market still getting fair support from export movement

Scrap Prices, Page 146

• **Pittsburgh**—The last representative purchase here was on the basis of $37 delivered. Allowing for broker's commission, that would make the range on No. 1 heavy melting $37-$38. However, the general feeling among traders is that $36-$37, delivered Pittsburgh, would be more representative of the market today. There's practically no buying by the mills, most of which seem to be producing enough home scrap to meet their current needs in conjunction with heavier hot metal use. In general, brokers and dealers think the market will hold pretty close to the present level for the next month or so, especially in light of expected slackening in steel production due to mass vacations at metalworking plants which will slow demand for finished steel.

• **New York** — Brokers' buying prices are unchanged throughout the list. Supply and demand are in balance. Demand is bolstered primarily by export shipments.

• **Philadelphia**—Domestic prices on No. 1 bundles and No. 1 busheling have advanced about $1 a ton to $45, delivered. Demand from district mills is spotty, but strength is sustained by stable export business and slower collections of yard and manufacturers' scrap.

• **Chicago**—Lack of buying by district steel mills is creating a weaker market tone. Prices are holding, however, and brokers indicate they're willing to sell at listed quotations. Some mills hold low inventories of important grades, but they show no inclination to build them up. Cast iron grades are beginning to be affected by the approach of foundry closings for vacations next month.

• **Cleveland** — Little additional buying is reported by brokers and dealers. The last representative sale was to a major Valley steelmaker—a tonnage of No. 1 heavy melting industrial material at $41, which was about $2.50 a ton above the price paid on previous orders. With steelmaking operations tending to decline as the summer vacation period nears, scrap traders don't anticipate much market activity until late in July.

• **Detroit** — The local market is quiet but steady, with only small lot trading among dealers being reported. Brokers see no major action until the auto lists close at the end

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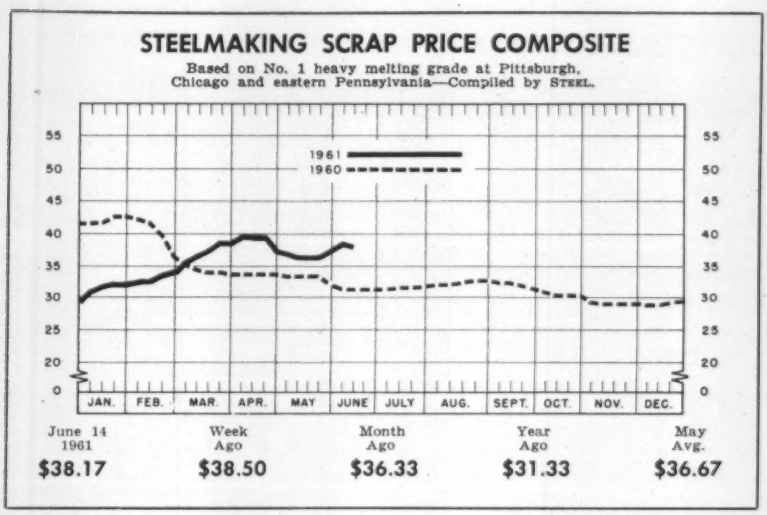

of the month. The feeling is that the market will peak in July or early August. Currently, no export orders are out here. Local mills are holding up buying.

• **Buffalo**—Steady export demand and fair buying by local mills continue to provide support for prices. Few orders have been placed since the start of the month, but dealers are filling requirements placed earlier by the mills. A cutback in steel production due to slumping orders, reported by a local mill, is causing some concern among scrapmen. However, most traders think the market will hold steady the rest of this month.

• **Cincinnati**—Prices are firm, with dealers shipping tonnage against two mill orders recently placed for delivery this month. Some movement out of the district by river is reported. New buying is expected next month.

• **St. Louis**—The market is firm, but the prospect for an early rise in prices is not promising. Recent signs of strength have faded away. Enough scrap is available to meet mill requirements without difficulty. Brokers are not doing much business.

• **Houston**—Major exporters in this district are predicting a third quarter decline in export volume. That could have considerable impact on prices unless domestic demand picks up noticeably. Current domestic prices are unchanged, with No. 1 heavy melting $35 against $34 for export.

• **San Francisco** — No. 1 heavy melting steel is quoted $1 higher, based mainly on export demand. The Japanese are ordering less scrap for the third quarter than in the preceding three months. Domestic demand is sluggish.

• **Los Angeles**—The market outlook is weak. Japanese orders for next quarter will be off 33 per cent from the tonnage placed for second quarter. A few dealers note a slight strengthening tendency, but there's little to be found in the over-all picture to suggest an early change in posted prices.

• **Seattle**—Exporters say the market is a little softer, but they are stockpiling at tidewater in anticipation of new Japanese orders. The Japanese are negotiating for their third quarter requirements. In the domestic market, demand continues slow but the mills are taking in metal in proportion to their current needs.

Wire . . .

Wire Prices, Pages 135 & 136

While manufacturers' wire is moving at a slightly faster pace than had been expected earlier this year, the mills can still give what amounts to prompt shipments. As a result, there's little incentive for consumers to order far ahead.

Auto requirements are likely to begin tapering, particularly next month when 1961 model runs will probably start closing out. Mass vacations in general metalworking plants will also affect demand adversely in July.

Steel Shipments Register Slight Gain During April

While shipments of finished steel products in April rose to 5,133,470 net tons, they were up only about 87,000 tons from the March total, American Iron & Steel Institute data show. Expectations are that the May and June shipment figures will better those for April by a substantial margin.

April shipments were off sharply contrasted with the movement in the same month of 1960 when the total was 6,741,809 tons.

The total for the first four months this year was 19,060,361 tons vs. 30,697,189 in the same period last year. Declines were reported in all product categories this year except: Reinforcing bars 707,859 tons vs. 633,312; bale ties and baling wire 18,022 tons vs. 17,829.

Warehouses and distributors were the leading outlets for the mills in April, taking 980,413 tons, the automotive industry ranking second with 841,275, construction third with 781,900, and containers fourth with 554,510 tons. In the first four months, the warehouses ranked first with 3,487,417 tons, followed by automotive with 3,172,496, construction third with 2,636,411, and containers fourth with 2,209,462 tons.

Tubular Goods . . .

Tubular Goods Prices, Page 139

Several large pipe inquiries are reported circulating in the South. Republic Steel Corp. has resumed operation of its large diameter pipe mill at Gadsden, Ala. Reason: The clearance of an order by a pipeline company for 30 in. diameter pipe. It's for gas transmission.

Following the lead of U. S. Steel Corp., other producers of seamless and electricweld line pipe are raising their discounts to allow for a price reduction that amounts to around $18 a ton. Only grade X52 in double random lengths, sizes 6⅝ through 12¾ in. OD, is involved.

Comment in the trade has it that the move was made by U. S. Steel

(*Please turn to Page* 152)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, June 14, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 14	$38.17
June 7	38.50
May Avg.	36.67
June 1960	31.33
June 1956	46.04

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	*36.00-37.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	*36.00-37.00*
No. 1 factory bundles	42.00-43.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	16.00-17.00
Cast iron borings	15.00-16.00
Cut structurals:	
2 ft and under	40.00-41.00
3 ft and under	37.00-38.00
Heavy turnings	27.00-28.00
Punching & plate scrap	41.00-42.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*34.00-35.00*
Stove plate	*34.00-35.00*
Unstripped motor blocks	*24.00-25.00*
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt	39.00-40.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	42.00-43.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy. melt., indus.	39.00-40.00
No. 1 hvy. melt., dealer	37.00-38.00
No. 2 hvy. melting	31.00-32.00
No. 1 factory bundles	42.00-43.00
No. 1 dealer bundles	38.00-39.00
No. 2 bundles	23.00-24.00
No. 1 busheling, indus.	39.00-40.00
No. 1 busheling, dealer	37.00-38.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	42.00-43.00
Punchings & plate scrap	43.00-44.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Stove plate	38.00-39.00
Unstripped motor blocks	35.00-36.00
Clean auto cast	48.00-49.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	44.00-45.00
Axles	58.00-59.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles, solids	185.00-190.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Rails, rerolling	61.00-62.00
Railroad specialties	41.00-42.00

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	39.00-40.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	39.00-40.00
Low phos, punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	41.00-42.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	43.00-44.00
Angles, splice bars	46.00-47.00
Rails, rerolling	55.00-56.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	75.00-80.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	38.00-39.00
No. 1 bundles	39.00-40.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	40.00-41.00
Electric furnace bundles	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.50-29.50
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	28.00
No. 1 bundles	34.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	*37.00*
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	37.00
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	43.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	*43.00*
No. 2 bundles	25.00-26.00
No. 1 busheling	*43.00*
Electric furnace bundles	43.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	43.00-44.00
Couplers, springs, wheels	43.00
Rail crops, 2 ft & under	52.00-54.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structurals & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & Solis	70.00-75.00
430 turnings	15.00-20.00†

BIRMINGHAM

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	35.00-36.00
No. 2 bundles	19.00-20.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	21.00-22.00
Bar crops and plates	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt	37.00-38.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	40.50-41.50
Angles, splice bars	42.00-43.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals:	
3 ft	40.00
2 ft and under	44.00-45.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	43.00

LOS ANGELES

No. 1 heavy melting	38.00-40.00
No. 1 hvy melt (export)	40.00-42.00
No. 2 heavy melting	34.00-37.00
No. 2 hvy melt (export)	37.00-39.00
No. 1 bundles	39.00
No. 2 bundles	25.00
No. 2 bundles (export)	27.00-28.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Cut structurals and plate 1 ft and under	50.00-52.00

Cast Iron Grades

No. 1 cupola	44.00-47.00

Railroad Scrap

No. 1 R. R. heavy melt.	42.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*41.00*
No. 2 bundles	*31.00*
Shovel turnings	16.00-18.00
Electric furnace	*52.00*

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	37.00
Unstripped motor blocks	*39.00*
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00-42.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00
Electric furnace	*52.00*

Cast Iron Grades

No. 1 cupola	*42.00*
Heavy breakable cast	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	*39.00*

SAN FRANCISCO

No 1 heavy melting	*44.00***
No. 2 heavy melting	*41.00***
No. 1 bundles	34.00**
No. 2 bundles	*28.00***
Machine shop turnings	18.00**
Mixed borings, turnings	18.00**
Cast iron borings	18.00**
Heavy turnings	18.00**
Shovel turnings	18.00**

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

*For export add $4 dock charge.
**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

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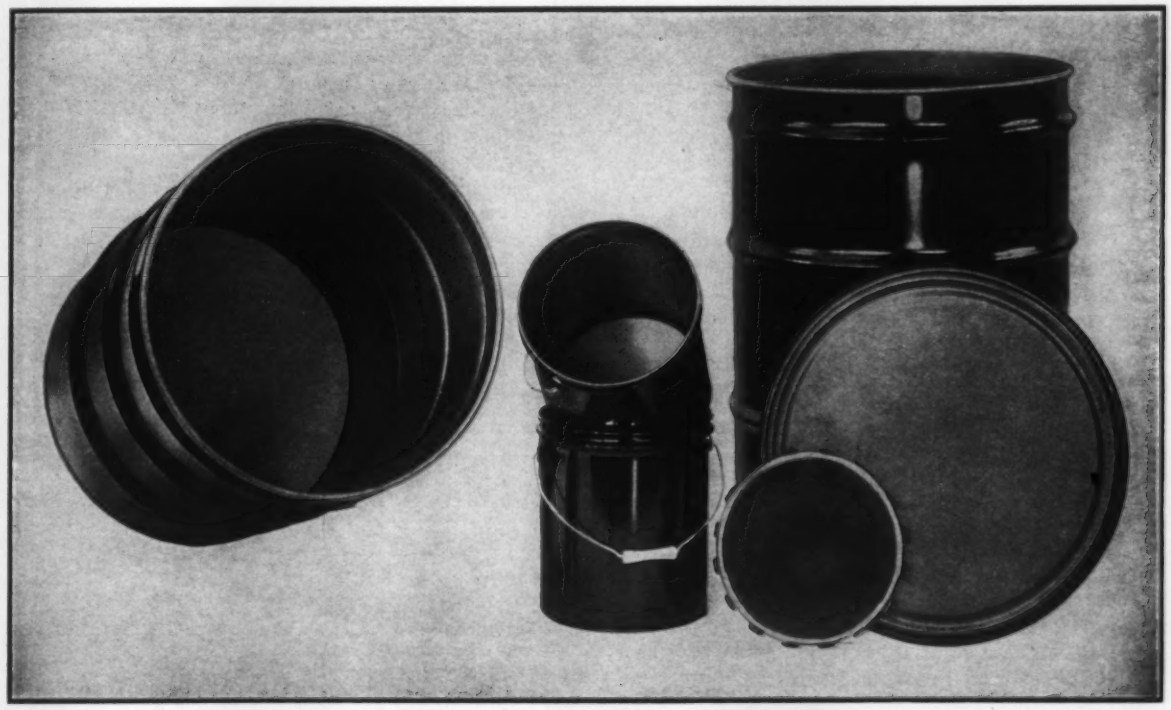

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Is Government Planning Stockpile Overhaul?

BURIED in a routine appropriations bill in Congress is a proposal that could have a far ranging effect on the metals industry.

On June 7, the House passed the Independent Offices Appropriation Bill for fiscal 1962. This is the $8.4 billion measure that provides moneys for around 20 agencies, such as General Services Administration. Included in the $535 million for GSA is a recommendation to upgrade the stockpile.

The Appropriations Committee's Report No. 449 ". . . provides the administration with authority to upgrade certain materials into a form best suitable for stockpiling and make payments to contractors in kind with excess materials in storage at their fair market value. It is estimated that $6.8 million of such upgrading will be done in fiscal 1962."

Considering the whole field of stockpiling, the committee goes on to say: "The committee urges that other avenues for reducing stockpile excesses be pursued because more than $9 billion is tied up in hand and on order. More than 50 per cent of it is excess to our national needs."

The specter of some sort of stockpile disposal plan has haunted the metals industry for years. And it's no secret there are strong feelings in some quarters of Congress that the stockpile should be cut. STEEL learned that the upgrading plan was originally submitted by the Bureau of the Budget and was approved by both the Office of Civil & Defense Mobilization and GSA. A GSA spokesman says that payments such as those described in the committee's language have been accomplished only once before. Other deals which GSA has tried to arrange have been vetoed by the Interior Department.

Questions asked in Washington: Is there a real limit in the House measure on how much upgrading with payment in kind could be done if industry decided it liked the business? How will industry control the program to keep materials from being dumped on the market by firms doing the upgrading?

The appropriations bill is awaiting Senate action.

1961 Looking Better

Nonferrous Metal Prices, Pages 150 & 151

THE TRADITIONAL midsummer lull in nonferrous sales may be less pronounced this year than usual, if it comes at all. That's the growing belief of metalmen who say that while the pace of the recovery is not fast, it is steady. May was generally the best month of the year. June looks like it will be at least as good.

• **Zinc Improves**—In May, the zinc industry had its best month since March, 1960, as shipments hit 79,599 tons (see graph). June may be better. For the first five months, slab zinc shipments totaled 349,822 tons compared with 385,910 tons last year. But, remember, the high level of activity in 1960 was in the first quarter.

Sales of prime western metal to galvanizers, particularly to producers of galvanized sheets, continue to run at a fast clip. There's a little pickup in demand from diecasters for special high grade metal, and confidence is growing that this market will continue to improve.

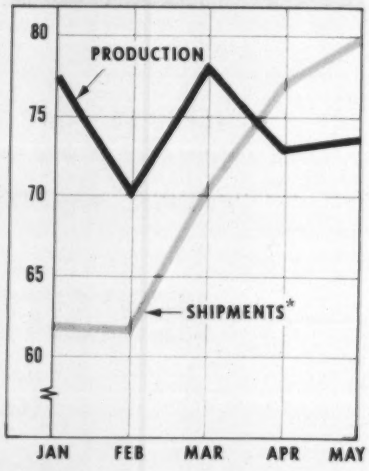
Production has fallen some over the year. Combined with rising sales, the result has been a slight drop in producers' stocks. At 213,054 tons, they're still too high, but the outlook is for further reductions.

Right now, the price of prime western at 11.50 cents a pound is stable. There's a feeling in zinc circles that if business continues to improve, the price will strengthen later in the year. Some discounting is still being reported in special high

(*Please turn to Page* 151)

Slab Zinc Demand Goes Above Output

(Thousands of tons)

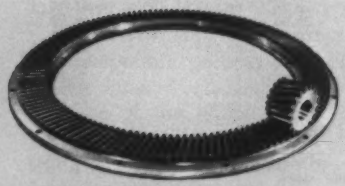


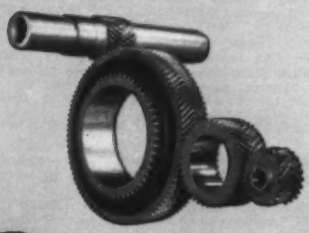
*Includes exports and drawbacks.

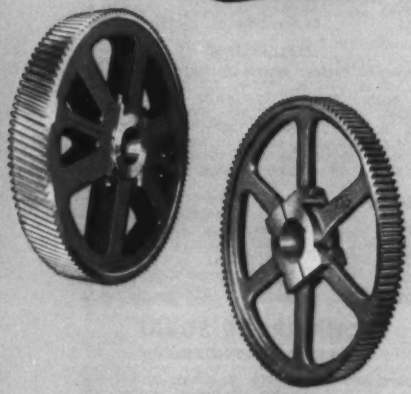
Source: American Zinc Inst'tute Inc.

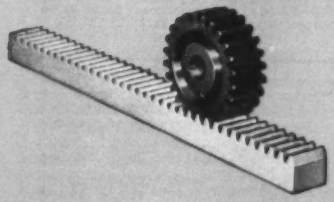
The Stamp of Final Approval on ILLINOIS GEARS

ILLG









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Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld.; custom smelters, 31.00 nom.; lake, 31.00 deld.; fire refined, 30.75 deld.

Germanium: First reduction, ingots, less than 1 kg. 36.00-37.50 per gram; 1-10 kg. 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb. $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $200-204 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 112.375.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Die casting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max., 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof, 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.60	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; 188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.75-25.25; No. 2 heavy copper and wire, 23.00-23.50; light copper, 20.50-21.00; No. 1 composition red brass, 21.25-21.75; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.61-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.71	51.27	61.54	....	19.25	19.00	18.25
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.375	26.125	25.375
Nickel Silver, 10%	64.83	67.16	66.91	....	25.25	25.00	12.626
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

(*Concluded from Page* 148)

grade zinc and the diecasting alloys.

• **Lead Quiet**—Lead demand doesn't appear to be greatly affected by the general economic recovery. May sales were fair; June orders are running at about the same level. There doesn't appear to be any strong sign of an upturn soon.

• **Aluminum Up**—Producers are becoming more optimistic about 1961—and with good reason. Figures released by the Aluminum Association show sheet and plate shipments for the first four months topped those of the like period of last year, 233,000 to 225,000 tons.

Business is still on the upgrade. Producers ran potlines at a little under demand earlier in the year so some of the bulky stocks could be worked off. Output has been rising for the last two months, and STEEL estimates the industry is operating at an annual rate of around 1.9 million tons. April production totaled 144,637 tons. May output should show a healthy rise.

Imports and exports dipped in April. For the first four months, imports of crude aluminum totaled 47,550 tons vs. 48,318 tons in the year-ago period. Imports of semi-fabricated shapes were up 6 per cent for the four month period.

The primary metal export market is way off from the records of last year. Through April, exports totaled 48,950 tons compared with 121,200 tons in 1960. Scrap exports have been dipping recently, but the four month total is still 9 per cent above last year's.

composition turnings, 20.25-20.75; new brass clippings, 18.50-19.00; light brass, 15.50-16.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 17.50-18.00; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 18.25-18.75; brass pipe, 19.00-19.50.

Lead: Soft scrap lead, 7.25-7.75; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00; turnings, 16.50-17.00; rods, 22.00-23.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 9.75-10.25; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.75-12.25; segregated high copper clips, 10.75-11.25; mixed low copper clips, 11.25-11.75; mixed high copper clips, 10.75-11.25.

(Cents per pound, Chicago)

Aluminum: O'd castings and sheets, 9.75-10.25; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 14.00; segregated high copper clips, 13.50; mixed low copper clips, 13.50; mixed high copper clips, 13.00-13.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 26.75; light copper, 24.50; refinery brass (60% copper) dry copper content, 25.00-25.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.75; No. 2 heavy copper and wire, 26.75; light copper, 24.50; No. 1 composition borings, 23.50; No. 1 composition solids, 24.00; heavy yellow brass solids, 18.50; yellow brass turnings, 17.00; radiators, 20.00.

NONFERROUS PRICE RECORD

	June 14 Price	Last Change	Previous Price	May Avg	Apr. Avg	June, 1960 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	26.000
Copper	31.00	May 19, 1961	30.50	30.423	29.000	33.000
Lead	10.80	Dec. 13, 1960	11.80	10.800	10.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	112.375	June 14, 1961	112.125	110.106	107.177	101.394
Zinc	11.50	Jan. 9, 1961	12.000	11.500	11.500	13.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

CLASSIFIED ADVERTISING

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Available at a good reduction under mill price steel sheets and plates, limited quantity only, range plates 3/8", 5/16", 1/4", 3/16", any width up to 60" maximum or decimal equivalent, sheets 7, 8, 9, 10, 11, 12, 13, and possibly 14 gauge up to 60" in width, specifications per your choosing from SAE 1005 to SAE 1050, plain, pickled dry, or pickled and oiled available, depending on specifications. Can also supply coils. All material from domestic manufacture off continuous mill. Exact sizes can be supplied. Must have complete specifications and delivery point so that proper quotation can be given. Prefer end-users, however, will accept serious inquiries from resellers. If interested, write:

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STEEL MILL ENGINEER—for position as Mill Manager in Argentina. Plant situated within 50 miles from Buenos Aires. Require graduate rolling mill engineer with at least 5 years experience in all aspects of structural and merchant bar mill and with good managerial abilities. Knowledge of the Spanish language preferred. Applicant must be fully qualified to supervise and operate existing facilities as well as to develop modernization and expansion program. Reply Box 938, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL MILL ENGINEER—for plant situated in Great Britain (Midlands). Experienced in milling and rolling of stainless steel. Applicant should be qualified to modify existing blooming and billet mill and to install and operate facilities for rolling slabs and bars. Reply Box 937, STEEL, Penton Bldg., Cleveland 13, Ohio.

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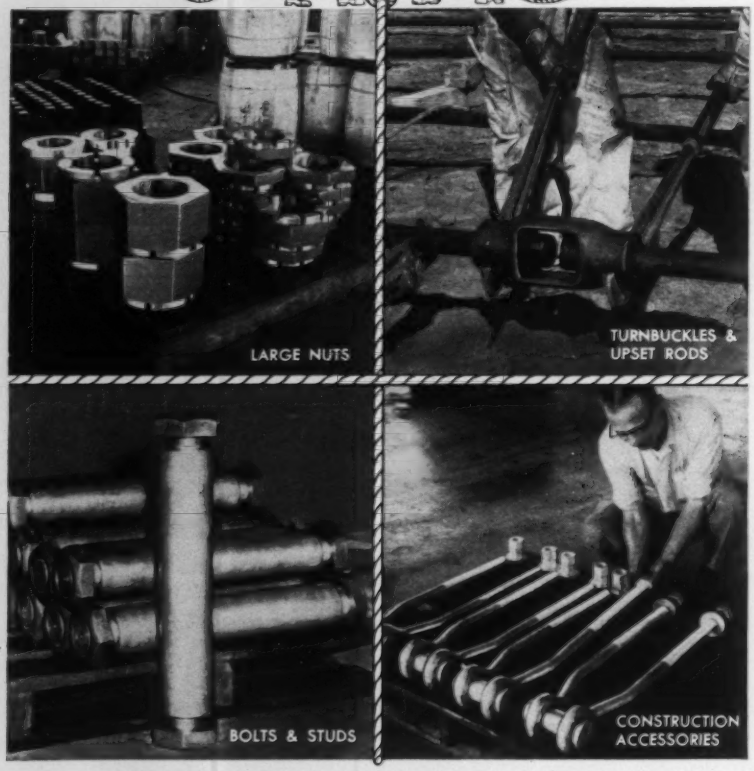

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DYSON

(*Concluded from Page* 145)

to meet rising competition from electricweld pipe. In recent years, there has been considerable expansion in electricweld capacity.

Another recent area of price weakness: Oil country pipe. The jobber discount was raised 4 percentage points in a move said to be aimed at stimulating stockpiling by jobbers.

Tin Plate . . .

Tin Plate Prices, Page 135

While tin plate continues to move steadily into consumption, demand isn't as strong as had been expected for this season. Canmakers, it's said, are finding consumption of cans is less than projected. Cool weather recently is blamed for reduced consumption of canned beer and soft beverages.

Tool Steel . . .

Tool Steel Prices, Page 139

Shipments of tool steels (excluding hollow drill steel) in April totaled 5987 net tons, reports the American Iron & Steel Institute. Shipments in March were 6528 tons and in April, 1960, they were 8098.

The movement in the first four months this year amounted to 24,415 tons vs. 38,307 in the same period a year ago.

Plates . . .

Plate Prices, Page 133

Plate requirements are a little off the month ago pace, but there's still a fairly good demand from tank and boiler fabricators and from the chemical industry. Also, there's brisk inquiry for piling and casing. More missile work is in prospect, requiring high strength, low alloy plates. Prospective Navy work, however, is being delayed. Some tonnage scheduled for bidding late in May has been postponed until July and August, and in some instances, programs have been canceled.

Most platemakers can still promise ten day to two week delivery on sheared carbon plates and three weeks on silicon killed steel which requires more processing and is primarily for pressure vessels.

Bath Iron Works Corp., Bath, Maine, will construct three guided missile frigates for the Navy at a cost of about $59 million.

Advertising Index

Acme Chain Corporation 6
Acme-Newport Steel Co. 122
Ajax Magnethermic Corporation 3
Alan Wood Steel Co. 78
Alemite Division, Stewart-Warner Corporation .. 24
Allen Manufacturing Co. 38
Allis, Louis, Co., The 30
Aluminum Company of America 103, 104
American Oil Co. 80, 81
American Optical Co., Safety Products Division 110
American Screw Co., A Division of Noma Lites, Inc. 32

Babcock & Wilcox Co., The, Tubular Products Division ...Inside Front Cover
Bethlehem Steel Co. 1, 40, 41
Blaw-Knox Co., Foundry & Mill Machinery Division 109
Bliss, E. W., Co., Mackintosh-Hemphill Division 29
Buffalo Forge Co., Air Handling Division ... 23

Carlson, G. O., Inc. 83
Carpenter Steel Co., The 26, 27
Chicago Steel Service Co. 98
Cincinnati Shaper Co., The 25
Clark Controller Co., The 143
Cleveland Crane & Engineering Co., The, Steelweld Machinery Division 28
Cone-Drive Gears Division, Michigan Tool Co. 129
Continental Steel Corporation 108
Copperweld Steel Co., Superior Steel Division 85

Duraloy Co., The 113
Dykem Co., The 144
Dyson, Joseph, & Sons, Inc. 152

Eastman Kodak Co., X-ray Sales Division .. 119
Electric Furnace Co., The 51
Esso Standard, Division of Humble Oil & Refining Co. 42

General Motors Corporation, Hyatt Bearings Division 58
General Steel Industries, Inc., National Roll & Foundry Division 37
General Time Corporation, Stromberg Division 82

Hallden Machine Co., The 97
Heresite & Chemical Co. 147
Hoover Ball & Bearing Co. 69
Horsburgh & Scott Co., The 10
Humble Oil & Refining Co., Esso Standard Division 42
Hyatt Bearings Division, General Motors Corporation 58

Illinois Gear & Machine Co. 149
Industrial Distributors (Sales), Ltd. 100, 101
Inland Steel Co. 120, 121

Kentucky, Commonwealth of, Department of Economic Development 52
Keystone Steel & Wire Co. 31

Landis Tool Co. 13
La Salle Steel Co. 57
Linde Co., Division of Union Carbide Corporation 72
Lodge & Shipley Co., The 127

McKay Machine Co., The 74, 75
Mackintosh-Hemphill, Division of E. W. Bliss Co. 29
Michigan Tool Co., Cone-Drive Gears Division 129
Midland-Ross Corporation, Surface Combustion Division 22
Midwest Steel, A Division of National Steel Corporation 11
Milford Rivet & Machine Co., The 65
Mobil Oil Co. 115, 116, 117
Mundt, Charles, & Sons 153

National Roll & Foundry Division, General Steel Industries, Inc. 37
National Steel Corporation 11
Niagara Machine & Tool Works 95
Nice Ball Bearing Co. 144
Noma Lites, Inc., American Screw Co. Division 32

Oakite Products, Inc. 84
Ohio Steel Foundry Co., The 66
Oilgear Co., The 7
Olin Aluminum 71
Osborn Manufacturing Co., The 76

Pangborn Corporation 126
Philadelphia Gear Corporation 86
Pines Engineering Co., Inc. 79
Pratt & Whitney Co., Inc. 33, 34, 35, 36

Republic Steel Corporation 14, 15

St. Joseph Lead Co. 138
Sandvik Steel, Inc. 77
Seaway Steel Corporation 16
Shell Oil Co. 61
Steel Equipment Co. 132
Steel Service Center Institute 12
Stewart-Warner Corporation, Alemite Division . 24
Stromberg Division, General Time Corporation 82
Superior Steel Division of Copperweld Steel Co. 85
Surface Combustion, A Division of Midland-Ross Corporation 22

Timken Roller Bearing Co., The, Steel & Tube Division 62
Torrington Co., The 21
Tubular Rivet & Stud Co. 124

Union Carbide Corporation, Linde Division . 72
United Engineering & Foundry Co. 137
United States Pipe & Foundry Co., Steel & Tubes Division 8, 9

Vanadium Corporation of America 2

Wales Strippit, Inc. 105
Ward Steel Co. 64
Warner & Swasey Co., The 4
Wean Engineering Co., Inc., The ....Back Cover
Weirton Steel Co., A Division of National Steel Corporation 11
Wheland Co., The 64
Wilson, Lee, Engineering Co., Inc. .....Inside Back Cover

~ ~ ~

Table of Contents, Page 19
Classified Advertising, Page 151

MUNDT
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